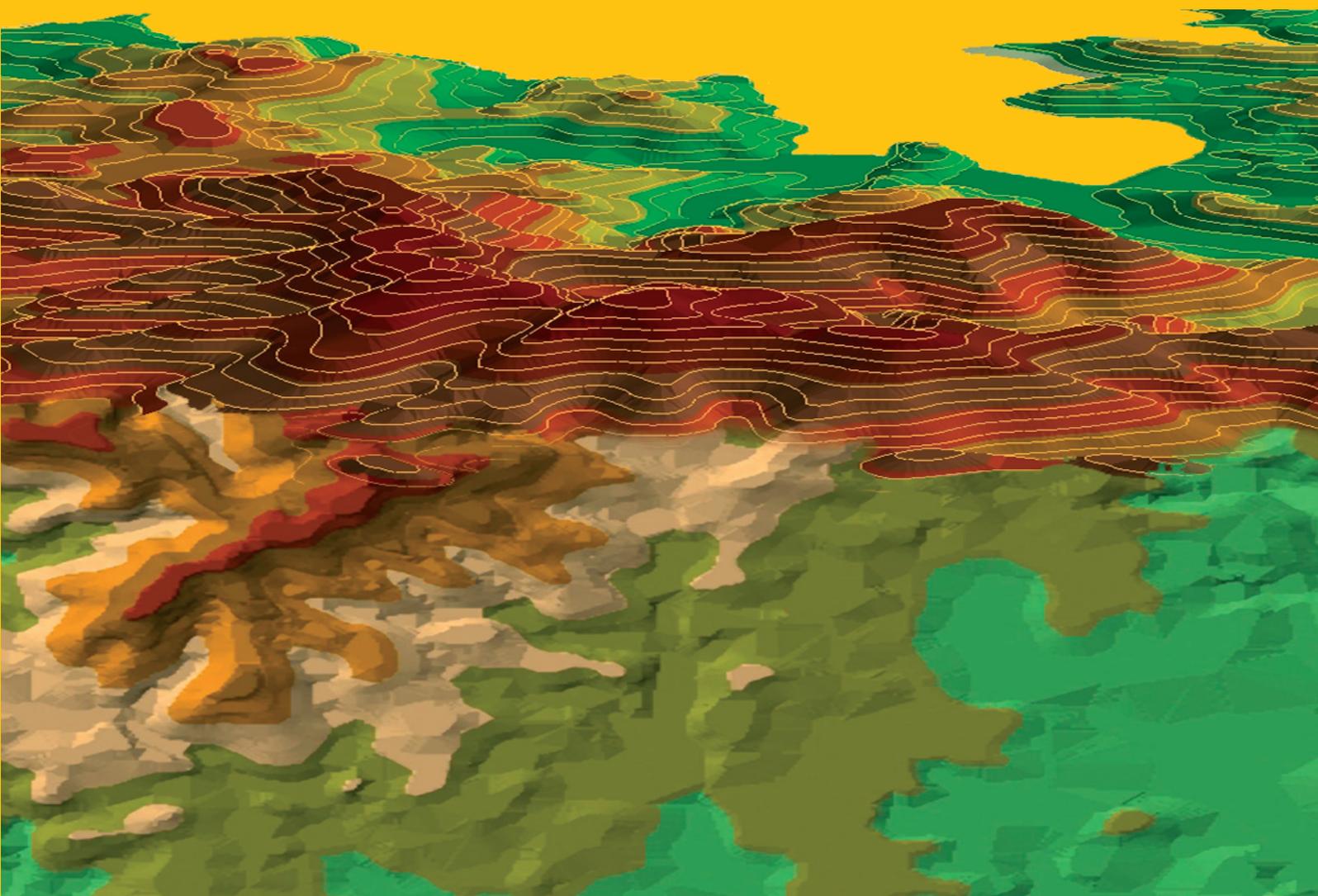# MORAVIAN
GEOGRAPHICAL REPORTS

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Fig. 3: Overgrowing apple orchard behind Malachov village in spring (Photo: M. Druga)

Fig. 4: Overgrowing of mountain meadows above Podkonice village (Photo: Photo: M. Druga)

Illustrations related to the paper by M. Druga nad V. Falťan

MORAVIAN GEOGRAPHICAL REPORTS

ECONOMIC, CULTURAL AND SOCIAL FACTORS INFLUENCING THE DEVELOPMENT OF GAY BUSINESSES AND PLACES: EVIDENCE FROM THE EUROPEAN UNION

Koessan GABIAM, Michal PITOŇÁK

Abstract

The late 20th century emergence of gay neighbourhoods and their related businesses has been examined by a number of researchers, but few have tackled this issue on a larger scale compared to case studies in a national context. This study considers the development of European gay businesses and gay non-residential places, using principal components analysis on data from the Spartacus International Gay Guide of 2007. This is an unusual quantitative approach in the largely qualitatively-dominated field of geographies of sexualities. It has identified gay commodification and gay (in)visibilities as the most likely factors of spatial diversity in observed gay places. These two identified dimensions are then analysed in terms of their linkages, specificities and regional importance. Subsequently, the interactions between economic, cultural and social factors at stake in the development of gay business and non-residential places across Europe, are evaluated.

Shrnutí

Ekonomické, kulturní a sociální faktory v pozadí rozvoje gay podniků a míst: situace v Evropské unii

Vznik gay čtvrtí a s nimi spojených gay podniků na konci 20. století byl objektem zájmu mnoha výzkumníků, ale pouze málo z nich – ve srovnání s případovými studiemi v kontextu národním – řešilo tuto otázku na úrovni celoevropské. Tato studie se zabývá rozvojem gay podniků a ne-rezidenčních míst za použití analýzy hlavních komponent aplikované na datech získaných ze Spartacus International Gay Guide 2007. Tento kvantitativní přístup je v oboru převážně kvalitativních geografií sexualit poněkud nezvyklý. Díky tomu byly identifikovány gay komodifikace a gay (ne)viditelnosti jako nejpravděpodobnější faktory vysvětlující prostorovou diverzitu zkoumaných gay míst. Tyto dva faktory jsou analyzovány z hlediska jejich spojitostí, specifik a regionální významnosti. Následně jsou hodnoceny interakce v rámci ekonomických, kulturních a sociálních faktorů působících při rozvoji gay podniků a gay ne-rezidenčních míst napříč Evropou.

Keywords: gay businesses and places, commodification, gay (in)visibilities, European Union

1. Introduction

Geography has evolved greatly and now spans various cultural, economic, political and societal domains, where its true potential can be recognized specifically in its ability to understand connections between these domains. As with the development of human societies, the character of geography has changed and is influenced by more and more complex interrelations. This paper is grounded in the geographies of sexualities, a geographical sub-field which developed originally in British and North American geographical academia (Brown, Knopp, 2002; Hubbard, 2001; Rose, 1995) under the larger influences of post-positivism and the 'new' cultural turn in geography from the 1970s. Later this field expanded to other countries in Western, Mediterranean and Central Europe, Australasia and Latin America. Geographies of sexualities are nowadays diverse fields of study covering issues ranging from homosexuality (Duncan, 1996; Binnie, Valentine, 1999), heterosexuality (Oswin, 2008), bisexuality (Hemmings, 2002) and transgenderism (Doan, 2007; Browne, Nash, Hines, 2010; Nash, 2010). We cannot provide a complete summary of its genealogy in the present article; however, a short introduction to the associated main concepts and cornerstones is relevant here.

The first studies associated with geographies of sexualities were set in North American urban sociology. Societal conditions after the turbulent 1960s allowed a focus on visible and material sexual urban contexts, specifically the political-economic development of so-called "gay ghettoes". These visible concentrations of both gay commercial spaces and gay residents were identified in major American cities such as New York, Chicago and San Francisco (Levine, 1979; Castells, 1983; Knopp, 1987). These studies were very descriptive, while focusing on processes such as urban renewal or gentrification and the role of gay populations and gay ghettoes in them. Any focus on lesbian geographies remained silent as their spatial dimension required more sensitive approaches to develop (Rothenberg, 1995; Johnston, Valentine, 1995). These first studies did not introduce any critical analyses beyond political-economic debates, but their main merit for later studies was that they brought the topic of sexuality (homosexuality) into the focus of academia and helped it become a new proper subject matter.

In the subsequent years in the late 1980s and 1990s, important developments of critical social theories, mostly feminist and queer theories but also the "general" postmodern and poststructuralist ways of thought, provided important background for more rigorous geographical research (Bell, Valentine, 1995; Duncan, 1996).

Power relations between people of normative (hetero) and non-normative (LGBTIQ…) sexualities started to be problematized. Previously unproblematic, heterosexual

practices such as holding hands, kissing or even living together had been identified as naturalized and inherently sexual (Valentine, 1993). In contrast, these same practices in same-sex couples were automatically perceived as sexual and "peculiar". Heteronormativity, as a normative regime, was therefore suggested as a structure which was about to be academically recognized. Similarly, as feminist scholars identified normative patriarchy, sexuality and queer scholars identified heteronormativity (Pratt, 2009). Space itself was recognized as vastly sexualized and normalized under the rule of heteronormativity, where sexual-others could not safely exist and manifold exclusions were achieved by creative regulative regimes (Howell, 2009: 122). Understandably, many geographers focused on the ways and practices of social (re)production of heteronormativity, and specifically on the ways in which space was being (re)produced as (hetero) sexual or heteronormative (Browne, Lim, Brown, 2007: 2; Gorman-Murray, Waitt, Johnston, 2008: 236).

The most influential factors were the theoretical works of post-feminist literary philosopher Judith Butler and (post)structuralist philosopher Michel Foucault, which informed new associated geographical scholarship (Foucault, 1995, 1980; Butler, 1990, 1993). Power as a factor was no longer "out of the theoretical reach", and the duality of 'structure and agency' continued to be studied in dialectical ways (Butler), human subjectivity and identity were deconstructed, ways beyond normative thinking and the perspectives of (sexual) majorities started to be sought. The loose association of approaches trying to reach these goals may be called queer theory[1].

During the 1990s most geographers still retained their urban focus, specifically in Europe where inner districts of major cities started to show interesting developments, or even explosions, of mostly gay commercial spaces. These urban developments, the so-called "gay villages", were closely connected to political, societal and economic changes in the late 1980s and 1990s. Geographers have begun deciphering various factors which have enabled the visible existence of gay spaces. The former term "gay ghettoes" became obsolete, pejorative and imprecise, and not only in the European context. Economic and political factors have been analysed in detail, especially those connected with the 'pink economy', which is a complicated term that might refer to a capitalist utilization of a disadvantaged groups' position (here non-heterosexual people). In other words, the pink economy might refer to a market niche available in heteronormative culture (Binnie, Skeggs, 2004), where certain environments (cities), with certain political-economies (democracy, capitalism), enabled the formation of gay- or lesbian-oriented commercial venues. Contemporary research in this field suggests (Bassi, 2006) that we should not jump to premature conclusions about the pink economy, as there might be other cultural-economic factors involved. We believe that our paper sheds some light on this issue as well.

What seems obvious, however, is that the developments of gay commercially-oriented venues did not cater to all non-heterosexuals, but indeed produced certain sexual-cultures (mainly gays') with their specific identity and inherently exclusionary politics. Thus the concept of homonormativity

suggested itself. Certain bodies such as male, white, young, handsome and willing to consume, were preferred to socialize in new glamorous gay bars, cafés or restaurants, while other bodies were implicitly or explicitly excluded (Gorman-Murray, Waitt, Johnston, 2008). As Lisa Duggan had put it: "homonormativity… does not challenge heterosexist institutions and values, but rather upholds, sustains, and seeks inclusion within them" (Duggan, 2003).

Many spaces such as home (Johnston, Valentine, 1995), gay and lesbian bars (Valentine, Skelton, 2003) were studied in relation to space and human identity formation, but the general economic, cultural and social factors influencing the development of such places remains largely understudied.

It is relatively self-evident now that the previously dominant spatial science, with its rigid paradigms and conceptualizations of human behaviour, cannot provide explanations to these socio-spatial developments. Space, place and landscape are no longer perceived as Cartesian or deterministic, but rather as socially produced and shaped by complex power relations. The theories indicated above have re-conceptualized the role of human beings and their agency, and wider understandings of the larger structural influences imposed on them. It was mostly feminist and queer theories in geography which raised our understanding that human beings are not all alike but different and socio-spatially structured in complicated ways, on the basis of their gender, sex, race, sexuality and the other axes of human difference (Valentine, 2007). The socially constructed nature of structures such as patriarchy and heteronormativity seem to have been already vindicated (Hubbard, 2001; Kirby and Hay, 1997).

In the 2000s, several geographers underlined important methodological issues in mapping quantitative data of gay and lesbian lives and migration, by critically using national censuses such as in the United States (Brown, Knopp, 2006; Cooke, Rapino, 2007) or in Australia (Gorman-Murray et al., 2009). Those studies gave birth to a rich reflection on the intersection of queer theory and social science research (Browne, 2010). Furthermore, as emphasized by Michael Brown and Larry Knopp: "serious engagements with sexuality necessitate a careful reconsideration of some fundamental ontological, epistemological and methodological issues" (2003: 313). This paper raises similar issues, bringing methodological questions into the dialogue with quantitative studies and the qualitative approaches, interrogating how global and national forces[2] interact with a marginal and cultural phenomenon such as the development of gay businesses and places, in terms of their structurally different distribution throughout the EU, Norway and Switzerland[3]. The methodological approaches in sexuality and queer geography scholarship may be diverse, but they are largely qualitative. We believe that this domination may be contested as unnecessary.

We now proceed with a methodological section where we describe our primary source of data, together with the chosen quantitative analytical tool – principal components analysis (PCA). Then we focus on the selected variables and discuss some of the initial observations. From these initial results, we identify two main principal components (CP1 and

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[1] For more about the queer theory, see Jagose, 1996.

[2] Being aware of other involved forces on different levels, such as local and city authorities, etc.

[3] Switzerland and Norway are not members of the EU, but their regional-political orientation is European. Therefore they had been considered in this research as if they had the same status as other EU states.

CP2) and focus on their interpretation and on an in-depth description of the results. We then conclude that issues of commodification and (in)visibilities are of major influence in structuring the spatial diversity of gay businesses and places. It is then the search for factors of gay (in)visibilities, commodification and gay place/spatial diversification, that lays behind our research interest.

2. Methodology

This paper focuses on the relative importance of gay facilities by analysing the proportion of the different types of 'gay places' in European cities, using quantitative methodology. The term 'gay' is used here for self-defined male homosexuals, whereas self-defined homosexual females are referred to as lesbians. Used as an adjective for the discussed places, it refers to those that permit self-defined homosexuals to live out their sexuality openly. From this perspective, patronising such places helps build a gay identity and culture, one in which homosexuality may be fully performed by discourses or acts.

For data analysis we utilized a principal components analysis (PCA), a mathematical version of 'factor analysis' which transforms a number of correlated variables, here indexed by the number of various 'gay places', into a (smaller) number of uncorrelated variables called principal components (see section 3). The term 'gay places' is used throughout this article for 'various gay places registered in the Spartacus International Gay Guide in its 2007 edition'. We utilized this 'guide' as a database for secondary data. This database has become a useful basis for other geographers and social scientists worldwide, so we are convinced that it is useful for analysing the spatial distribution of gay facilities through the end of the 20th and the early 21st century (Blidon, 2007; Salinas, 2007; Leroy, 2005).

Despite some criticism for often being slow in rectifying out-of-date address details, the Spartacus database was utilised for its uniqueness in presenting a global list of gay businesses, associations and cruising locations[4] alike. Therefore, we assumed that the selection criteria for listing were standardised, and hence comparable for all European countries. In this way the probability of errors was similar in all studied regions of the EU, Norway and Switzerland: for example, there was the same probability for listing a closed gay business or not including an active one in the study region.

Further, it is important to state that the Spartacus Gay Guide does not specifically cater to lesbians and the other sexual or gender minorities (bisexual, intersexual, MSM[5], transgender, etc.) and only in its first edition in 1974 did the authors include a focus on lesbian venues. Due to the Spartacus Gay Guide's narrow 'gay' focus, we have to limit the validity of most of our conclusions to 'mainstream gays'. At the same time, however, we bear in mind that people with other sexual identities are potential customers

of the studied venues, and that most of these neither exclude them nor should they. It has been recognized in various studies that the potentials for sustaining solely lesbian venues are low, due to lesbians' weaker economic power (Adler, Brenner, 1992; Bondi, 1998; Duncan, 1996; Valentine, 1993; Weightman, 1981; Moran, 2001: 410). It is probably because of this situation that we did not find any comparable database for lesbian venues which would complement the data for 'gay venues' listed in Spartacus Gay Guide. Admittedly then, parts of lesbian geographies remain largely undiscovered by geographers and deserve further investigation. Significant contributions to lesbian research have been made during the last decades by several geographers such as Gill Valentine (1993a) or Nadine Cattan and Anne Clerval (2011).

While being aware of certain limitations, we are convinced that this methodology has enabled us to perceive overall patterns that would stay hidden or implicit if a qualitative methodology was used. The chosen methodology sheds light on some underlying factors of the emergence and development of 'gay places' in large cities, while staying at a European scale. This offers an opportunity to test some hypotheses proposed by the large body of scientific research on gay, lesbian and queer geography during the last decades. Such research suggests some explanations for the development of gay residential and commercial neighbourhoods – by gentrification and central urban regeneration processes in England (Collins, 2004); for Spain, Garcia Escalona (2000) uses the term 'ghetto' when dealing with Madrid's Chueca's case; and in France the 'Marais' case in Paris is explored by Michael Sibalis (2004). Although most of the existing research makes use of case studies and local or national data sources, this article utilises a rich international database for the purpose of uncovering and analysing complex mechanisms and trends which may lead to the diverse and uneven development of gay spaces in Europe.

3. Data analysis

The focus for the present study was the proportion of types of gay facilities in European cities with at least 100,000 inhabitants. Each city having at least 100,000 inhabitants presented in the Spartacus Gay Guide 2007[6], even if there was just one 'gay place', was integrated into the database for the PCA. Both criteria led to a total of 377 cities.

Preliminary analyses on these sampled cities did not lead to a clear identification of possible explanatory factors. Therefore, our subsequent analysis focused on 168 European cities, which are comprised of urban areas with at least 100,000 residents (defined in the Morphological Urban Area as fixed by IGEAT-ULB in the ESPON study on urban functions)[7], and where at least 10 'gay places' were located. The latter threshold is set in order to meet 'normal' analytical requirements for a database in terms of statistical

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[4] Cruising places are exterior spaces (e.g. parks, wooded areas or service areas) where men can meet other men for brief sexual encounters.

[5] Men who have sex with men.

[6] We have counted up the number of 'gay places' listed in the Spartacus Gay Guide issued in 2007 and established a Europe-wide database. We were not given permission by the Spartacus Gay Guide editor to publish such a database nor set it up as an open source resource, however.

[7] ESPON is the European Spatial Planning Observation Network, which researched the delimitation of urban areas in Europe. Since the definition given to a city or to an urban area differs from country to country, one aim of ESPON, among others, is the establishment of the number of inhabitants in urban areas on the basis of multiple data sources whilst utilizing a common methodology in the data collection across all European countries.

power. Interestingly, several authors have posed the question of a threshold value for the sustainability of gay business or to represent its significance in cities. It has been suggested that at least 50,000 people were needed as a source population for sustaining a gay venue, such as a gay bar (Miller, 2009). Having more than 20 'commercial establishments catering to gays' seemed to Dennis Altman (1996) an acceptable criterion to select cities worldwide, where gay commercial expansion was occurring. Such thresholds should be fixed by taking the scale of the analysis into account.

We based our PCA analysis on 27 different categories of gay places, representing businesses and locations from the Spartacus Guide in its 2007 edition. Some of the variables have been aggregated, whereas other guide categories have been split for reasons of geographic location. This study focuses on urban areas, therefore the nation-wide categories of the Spartacus Guide (like national gay info, publications, companies or help lines) were not used. In addition, any on-line categories without a street-level address were not included. Regarding the cruising (see footnote 5), two categories were set up by distinguishing between cruising places located in swimming pools, added to the beach category, and all other cruising places. The categories of culture, museum, archives and monument were merged, because of their limited size and close relationship to culture in general. The averages and standard deviations of the 27 categories are shown in Table 1. The most frequent categories in the 168 studied cities were bars (22% of the gay places)[8], cruising places (16%), dance clubs (9%) and saunas or bathhouses (7%).

Category	Average presence among 168 cities	Standard deviation	PC 1 loadings	PC 2 loadings	Identifying number in Fig. 2
Culture / monument / archives / museums	0.27	0.93	0.20	− 0.31	7
Fashion shops	0.33	0.89	0.53	− 0.08	10
Massage	0.33	0.61	0.16	0.40	19
Fitness studios	0.35	0.83	0.52	− 0.19	11
Drag shows	0.35	0.82	0.36	0.27	25
Travel agencies	0.48	0.94	0.49	0.11	27
Cinemas/Blue movies	0.60	1.86	− 0.13	− 0.49	3
Escorts/Studios	0.61	1.28	0.18	− 0.19	9
Local publications	0.73	1.17	0.51	0.22	18
Private accommodation	0.88	1.41	0.45	− 0.16	21
Leather/Fetish shops	0.90	1.55	0.44	0.08	17
Bookshops	1.04	1.56	0.29	0.03	4
Health groups	1.08	1.85	− 0.03	− 0.44	15
Gay tourist info. (not Internet)	1.81	2.44	0.05	− 0.56	12
Apartments	1.86	2.81	0.54	− 0.21	1
General groups / Other groups	1.90	2.93	− 0.12	− 0.27	13
Guesthouse	3.19	4.78	0.21	− 0.42	14
Men's clubs	3.44	3.16	0.47	0.14	20
Cafes	4.00	3.94	0.10	0.30	5
Cruising places (beaches and swimming pools)	4.65	6.05	− 0.33	− 0.38	26
Restaurants	5.30	4.89	0.58	− 0.14	22
Sex shops and Blue Movies	6.01	4.74	− 0.21	0.17	24
Hotels	6.09	6.01	0.57	− 0.15	16
Saunas/bathhouses	6.63	4.66	− 0.24	0.13	23
Dance clubs	9.43	6.01	− 0.25	0.11	8
Cruising places	15.56	13.14	− 0.68	− 0.10	6
Bars	21.67	10.86	0.07	0.64	2
Hypothesis category 1: Total gay places	Not in PCA	Not in PCA			A
Hypothesis category 2: Urban area population	Not in PCA	Not in PCA			B

Tab. 1: Selected aggregate variables (categories) included in the PCA

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[8] Concretely, every city of the sample (having more than 100,000 and having at least 10 places), has at least two bars, generally speaking. Further, there are 10 cities from the sample that have no bars among their gay facilities.

When assessing the geographical distribution of 'gay places' at the European macro-regional level, it became clear that there is a relationship between population size and the number of registered 'gay places'. Table 2 displays the total number of 'gay places' for selected European countries: note that the more populated European states, such as Germany, Spain, France, Italy or the United Kingdom (UK), also have the highest counts. As will be obvious to many readers here, there are however great discrepancies between a country's population and its number of 'gay places'. For example, consider Poland with 40 million inhabitants and Czechia with 10 million inhabitants – respectively having 92 and 97 gay places. Such discrepancies are about to be explained by factors revealed in this study.

This relationship was considered further by analysing the correlation between urban area population, as given in the ESPON study (see footnote 7), and the number of 'gay places' per urban area.

Country	Number of 'gay places'	Number of gay places (cities having at least 10 'gay places')
Germany	1245	1138
Spain	995	685
France	863	729
Italy	685	479
UK	555	236
Netherlands	309	265
Belgium	234	174
Switzerland	150	146
Greece	121	39
Austria	106	81
Portugal	105	99
Sweden	101	40
Czechia	97	84
Poland	92	62
Denmark	69	62
Hungary	63	54
Ireland	49	49
Romania	49	19
Finland	48	35
Norway	39	28
Bulgaria	36	21
Slovakia	24	19
Estonia	23	19
Slovenia	21	15
Lithuania	20	10
Cyprus	19	12
Latvia	17	17
Luxemburg	14	14
Malta	7	0

Tab. 2: Number of 'gay places' per selected European country

The correlation is quite strong at 0.66 for the preliminary sample of 377 cities. This explains why the European megalopolis, the so-called blue banana, a large area stretching from Southern England to the large cities in Benelux countries, Western Germany, Switzerland and Northern Italy, is immediately obvious (see Fig. 1). Some important exceptions exist, however. For instance there is a group of large capital cities (specifically in the Central European region) with relatively small numbers of gay facilities. The only exceptions are Budapest and Prague, which are relatively well-served. The opposite situation can be observed at sea resorts with mostly smaller populations, such as Sitges, Ibiza, Benidorm or Torremolinos (Spain), Mykonos (Greece), as well as Blackpool and Brighton in the UK. The situation at the sea resorts can be relatively easily explained due to their commercial-tourist orientation and not to a permanent residential orientation.

Principal components analysis (PCA) was used for the purpose of identifying the most important linkages between the variables. PCA is helpful to calculate, visualise, and comprehend such linkages. This statistical analysis aims to select a subset of variables from a larger set, based on which original variables have the highest correlations with the principal component. Geometrically, the produced component may be understood as the axis or vector passing through the maximum variation (variance) of the projected values of the original observations (data points). Successively, new independent components are created with decreasing variance accounted for in the residual variance matrix. Further developments in PCA are demonstrated by I. T. Jolliffe (2002). The results of the PCA are displayed as new variables (the principal components), which synthesise the included information in the initial 27 variables. Here, it is useful to treat our database because it consists of numerous categories (27) observed in 168 cities. This fact makes the database complex if we want to find out directly whether any geographical opposition exists between cities and/or countries regarding the kind of existing gay facilities they have.

This study examines only the two most important principal components. These two components account for a total of 57% of all variance (i.e. the information in all original 27 variables), with the first component accounting for 37% of the variance, and the second for 20%. Furthermore, the component matrix represents a projection of the two first components' plan, which enables one to visualise the position of each variable when projected on the plan of the two new dimensions or components, CP1 and CP2 (see Fig. 2 and detailed legend from Tab. 1). On the basis of the PCA results, we focus our attention on the highest correlations between variables and components which resulted in the identification of the two first components: a detailed discussion is presented in the following section.

4. Commodifying 'gay places'

The first dimension that arises from the analysis, the first principal component (CP1), is positively correlated with restaurants (Fig. 2, label 22), hotels (label 16), and apartments (label 1). On the opposite side of the axis, cruising places (Fig. 2, label 6) have the highest negative correlation (− 0.68) with CP1. As places of accommodation (comfortable) and cruising places (uncomfortable) obtain the highest correlations, this relation might be described as a gay 'comfort' axis. Since accommodation capacity is linked to tourism, an interpretation of CP1 as a touristic dimension is also feasible. In his study, Howard
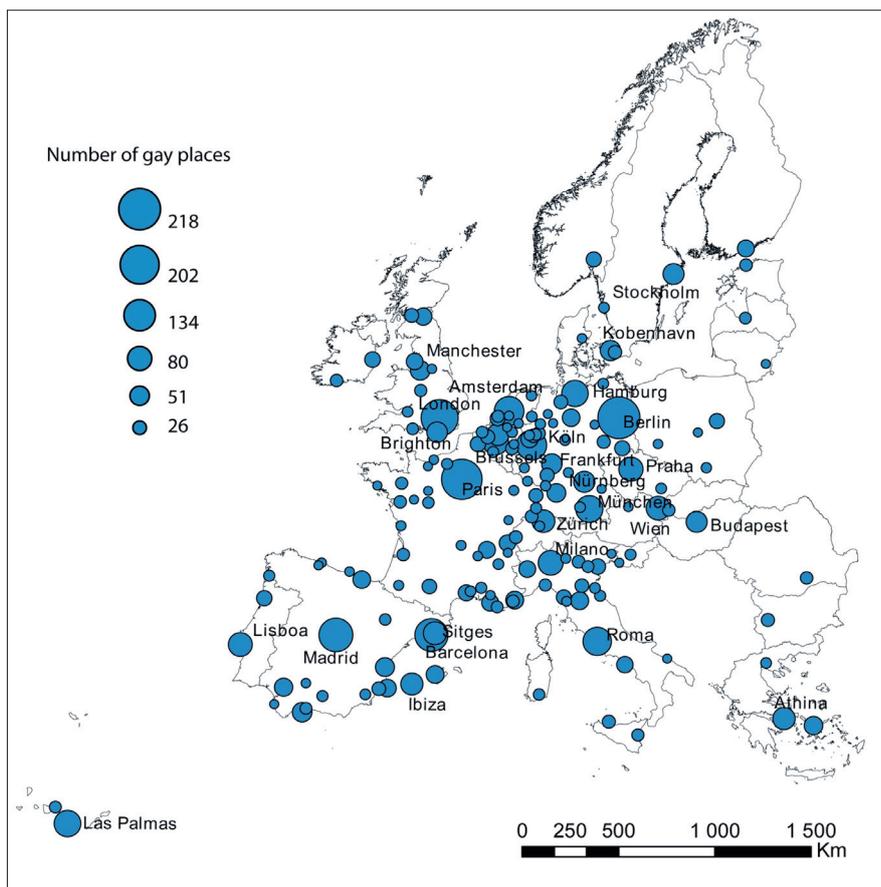
Fig. 1: Total number of gay places and businesses in major urban areas in the EU, Norway and Switzerland
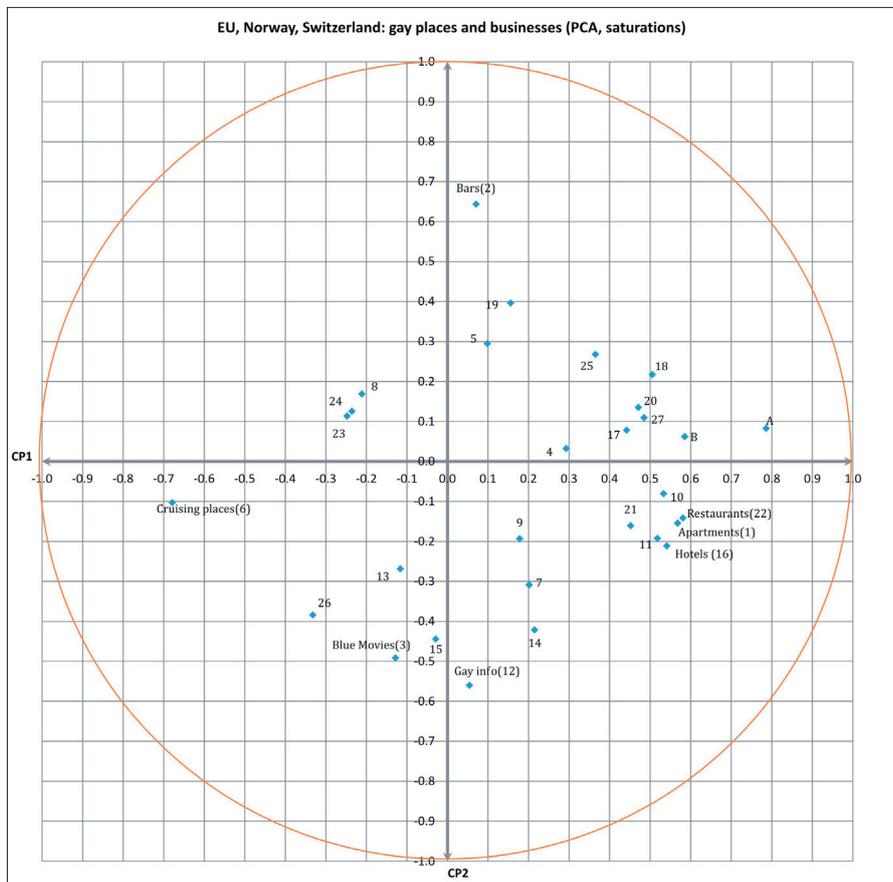*Sources: Spartacus Gay Guide (2007); made with Philcarto: http://philcarto.free.fr*

Fig. 2: Variable loadings on the first two principal components, data on gay places and businesses in EU, Norway and Switzerland. Source: Computed by authors´

Hughes (2006) reported a survey that portrayed hotels as the most used accommodation by gay and lesbian travellers; nevertheless, bisexual, transgendered and the other sexual minorities have access to them as well. Interestingly, hotels have a higher correlation with the first component than apartments or private accommodations, even if they supposedly offer more privacy to gays. Therefore, 'comfort' may be considered as a consequence of a touristic dimension. On the other hand cruising places appear to be more frequent in smaller towns (from the pool of over 100,000 inhabitants cities) than in larger cities. Therefore, we can also think that the PCA opposes small towns to larger cities and that CP1 is also interpretable as an urban hierarchy axis (see Fig. 2, the correlation of the variable 'Total 'gay places''/ short label A).

The variable 'urban area population' (short label B) was also projected on the components graph as it shows a correlation of 0.6 with CP1. This result is weaker in absolute value than the correlation of − 0.68 for the cruising variable, but this can be explained by the unique significance of seaside resorts, which are well-served while being less densely populated. Nevertheless, an interpretation of the first component as a touristic dimension, together with the urban hierarchy, is not necessarily contradictory. Here, it is useful to keep in mind that the correlation coefficient between overnight stays[9] (European Cities Tourism, 2011) in cities and the population of the urban area is 0.55, which shows a strong link between the urban hierarchy and urban tourism.

Besides the factors discussed above, commodification processes of gay culture are at stake in the entrepreneurial cities. As mentioned in the introduction, the commodification of gay culture is considered by some authors (Binnie and Skeggs, 2004; Hughes, 1997) as a tool for attracting global capital flows into cities by funding the rise of gay villages in city centres (e.g. the gay village in Manchester, UK). Therefore, over-equipped cities with gay facilities can be seen as those that invested the most in the commodification of gay culture. In this respect, gay villages represent cosmopolitan environments which aim to attract tourists and affluent residents.

As commodification in the late post-industrial phases of advanced capitalism can incorporate some previously marginalised groups, herein gays, for example through processes of commercial and residential gentrification and media marketization, some gays and lesbians remain excluded from such villages, frequently on the basis of their seemingly extravagant gender identity, race, age or class (Binnie, Skeggs, 2004; Rushbrook, 2002). Therefore it is not a surprise that recent commodification also appears to cause segmentations among gay people, while constructing what should be the 'good gayness' and diffusing this model of the 'global gay' in the 'West' and worldwide (Altman, 2001). According to Bell and Binnie (2004), this is connected to the process of 'homonormativity' and to a broader agenda of assimilationist sexual citizenship, producing a global repertoire of themed gay villages.

Consequently, all the labels proposed as an interpretation of the first component (comfort, tourism, urban hierarchy) may be explained by the commodification of gayness, because comfort is linked to tourism which may be a result of the urban marketing of gay villages. As it is, these gay villages

have developed in major 'Western' cities as homosexuals and gays moved to large cities to escape historical sexual and social constraints of traditional life (Aldrich, 2004), and in some instances (North American cities) to gain political power by residential concentrations in former 'gay ghettos' (Castells, 1983). Since the 1980s, several cities in North America, Western Europe or Australia, became the receiving zones of global capitalist flows (Lauria and Knopp, 1985), due to local governments' actions for urban marketing and the gentrification of gay neighbourhoods. In addition, a commercial gentrification is at stake in several cities worldwide, including events that cater for gay people such as 'gay and lesbian prides' or 'gay games' (Wait, 2006). These developments could be understood as a consequence of the rise of the 'recreational city paradigm' in some parts of the world. Beyond this theoretical background, a map (Fig. 3) of the CP1 scores may be useful for a better understanding of the PCA results. Several cities have positive scores on CP1, meaning that gay facilities like hotels or restaurants are over-represented in such cities. We have distinguished four main categories here.

The first group of cities comprises the national capitals such as Berlin, Paris, London, Madrid, Amsterdam, Brussels, Prague, Rome, Budapest, Copenhagen, Tallinn and Ljubljana. The second group comprises other cities with a minimum population of 500,000 inhabitants (Hamburg, Cologne, Nuremberg, Zurich, Milan, Barcelona, Antwerp, Edinburgh, Florence, Venice and Nice). The third group includes other prominent cities (Montpellier, Bologna[10], Frankfurt, Pisa, Vigo, Dresden, Bruges and Charleroi), and the fourth group represents the seaside resorts (Las Palmas de Gran Canaria, Blackpool, Sitges, Mykonos, Ibiza or Viareggio). All of these four groups of cities obtained significantly positive scores on CP1.

In contrast to these positively represented groups, another group of national capital cities is slightly negative, so they are under-equipped (Dublin, Lisbon, Oslo, Stockholm, Helsinki, Athens and Vilnius) or heavily under-equipped (Luxemburg, Riga, Bratislava, Bucharest and Sofia) with respect to this gay commodification index. In this latter grouping, two subgroups can be discriminated. First, cities that are located in rather isolated but rich regions with long-term effects of commodification (Dublin, Oslo and Helsinki), and secondly cities which are less affluent and/or isolated when it comes to the timing of effects of commodification and discourses of capitalism coming from the West (Athens, Vilnius, Riga, Bratislava, Bucharest and Sofia). Luxemburg remains complicated, with a role played both by the small population size of the city and the presence of other large gay cities nearby.

Evaluating the first component scores map confirms, by and large, our interpretation of the first axis as a dimension of commodification and subsequent tourism activity. High and low scores on the first component, however, are surely not only influenced by the impacts of capital, but also by a wider array of cultural effects such as religious and traditional values (Štulhofer, Rimac, 2009), or the transitions towards more post-materialist cultural values (Inglehart 2006) – such as liberal values, civil rights and democratization. Indeed, the wide array of research conducted during the past two decades suggests that this cultural background plays an

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[9] Data source: City tourism statistics compiled by European Cities Tourism (2011). Data for cities such as Paris, London, Amsterdam or Vienna were not available.

[10] Bologna is often portrayed as city with the highest number of gays in Italy. See for example p.17 of the following report: http://www.creativeclass.com/rfcgdb/articles/Italy%20in%20the%20Creative%20Age.pdf
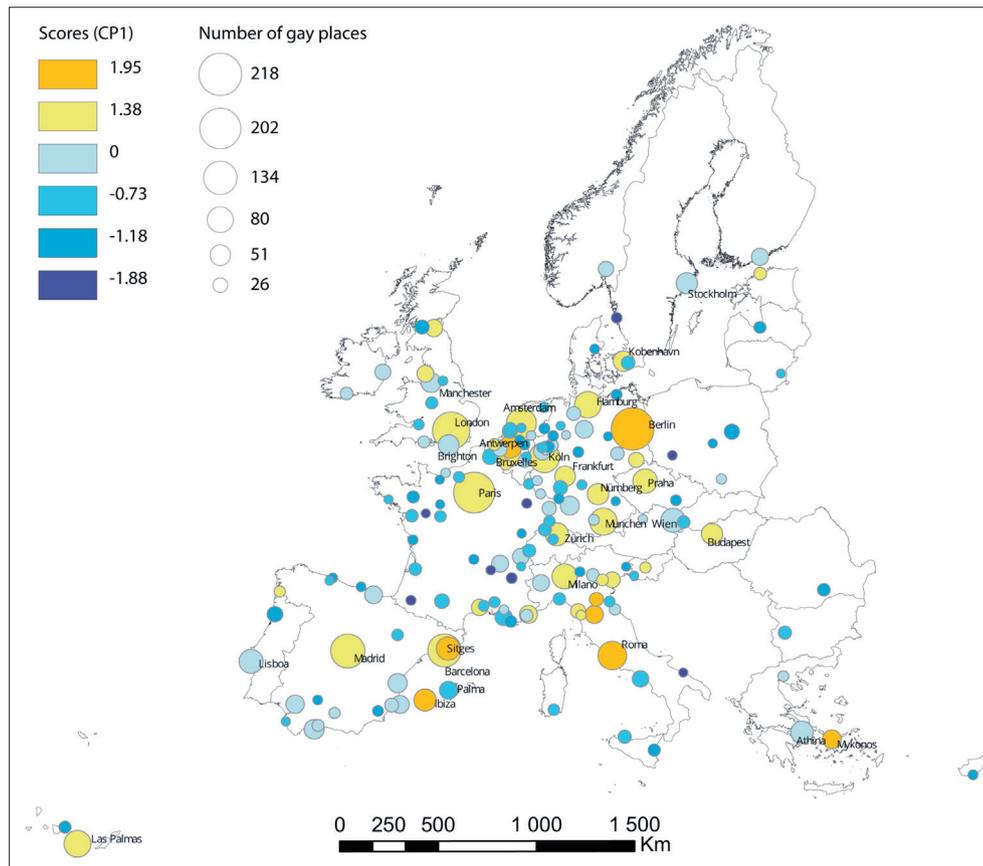
Fig. 3: CP1 scores for selected cities in Europe
Sources: Spartacus Gay Guide (2007); made with Philcarto: http://philcarto.free.fr

important role in the development of gay places. We will elaborate these factors in more detail while uncovering how they are related to the second component.

5. Locating places of gay sociability and problematizing spatial gay (in)visibility

This section discusses and interprets the second component (CP2) on the basis of the component loadings (i.e. the correlations between variables and the component: see Fig. 2 above), as it would be difficult to interpret the second component's map prior to analysing these loadings. In such an attempt, the highest correlations will be given priority.

Gay bars have the highest positive correlations (+ 0.63) on CP2 and thus constitute the best variable for interpreting this component. On the opposite side, it is 'gay/tourist info' (places where gay information may be found: − 0.58), gay blue movies (gay porn cinemas: − 0.5) and health groups (− 0.45), which have the highest negative correlations. A comparative reading of Fig. 4a (map of CP2 scores) and of Fig. 4b (map of bars) makes their relationship clear from their common distribution patterns.

Gay bars are portrayed by several authors as sociability places[11] for gays (see Marianne Blidon for France, 2007), or as Salinas (2007) puts it for Spain, spaces for their social relationships. Gert Hekma (2006) underlines the bars' exclusivity to the gay scene of the 1960s and the 1970s: that

is to say, a gay scene without gay bars was then unthinkable. Bars also played a crucial role in the rise of the gay movement in the USA (cf. the Stonewall Inn). Opening a gay bar was seen as both a militant and an entrepreneurial act at the same time by the owners of gay bars, as several authors have pointed out for Paris's gay village "le Marais" (Sibalis, 2004; Giraud, 2009). These gay businesses spearheaded commercial gentrification in many major cities in the "West" (Western Europe and North America mainly) and contributed to subsequent gay visibility.

Nowadays, it is very common in several West European cities to see gay activist activities linked to a particular bar (associative bars). Furthermore, gay bars serve as places of social (re)production of gay sub-cultural values of masculinity, as they differentiate on the basis of their performed gay identities, especially in major cities (Bell, Valentine, 1995). In this sense, bars contribute to a long-term construction of gay identities by giving room to its expression, performativity and reproduction for some gay people (De Busscher, 2000). Gay bars moreover cater to other people including bisexuals, or 'interested straights', in contrast to venues presenting movies with explicit sexual content (blue movies[12]). These cinemas cater exclusively for men. Showing 'blue movies' puts these cinemas into the category of 'places of sexual encounters', that Salinas (2007) described in the Spanish case to be places of furtive (sexual) encounters that are characteristic for places of reduced

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[11] Sociability places should be understood as places where sociability occurs, whereas social relationships spaces are those where social relationships can be built. We would like to point out here that gay bars may play both roles for gays and other sexual minorities.

[12] These « Blue movies » also carry a 'VS' code for 'video shows' in the Spartacus Gay Guide.

homosexual visibility. Thus, we can conclude at this stage that the second axis contrasts closeted (hidden and more secretive) gay subculture with a more open and visible mainstream gay subculture.

The two categories 'gay/tourist info.' and 'health group' were also among the highest negatively correlated variables with respect to CP2. We will discuss them further in order to test the hypothesis about this axis (CP2).

The 'gay/tourist info.' variable is an aggregated category (Fig. 2, short label 9) and includes local gay groups and inquiry points for tourists. Fig. 5b shows that this category of gay facilities is present in every major Italian city in the sample, except for Viareggio and Venice. Gay groups seem to have a wide diffusion in Italian cities. Such an observation leads to several questions. Does this point to a real difference in Italian gay groups' capabilities (as opposed to the other
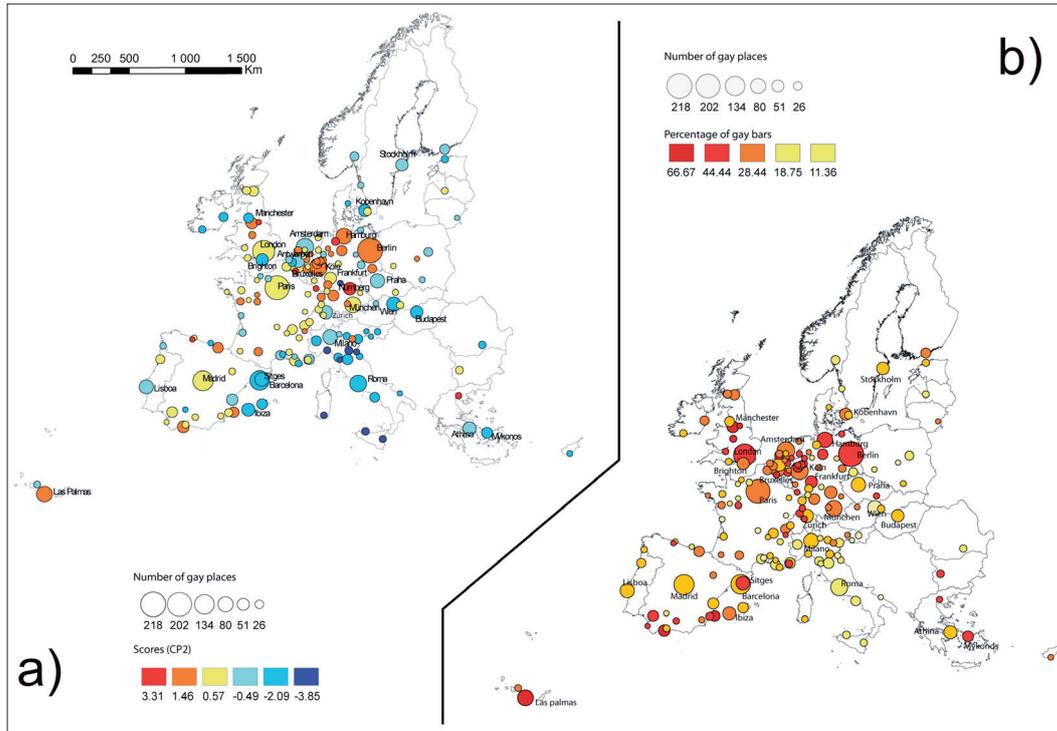
Fig. 4: a) City scores on the second component (PC2). Source: authors' calculations; b) Percentage of gay bars in the total number of 'gay places' per urban area in the EU, Norway and Switzerland in 2007. Sources: Spartacus Gay Guide (2007); made with Philcarto: http://philcarto.free.fr
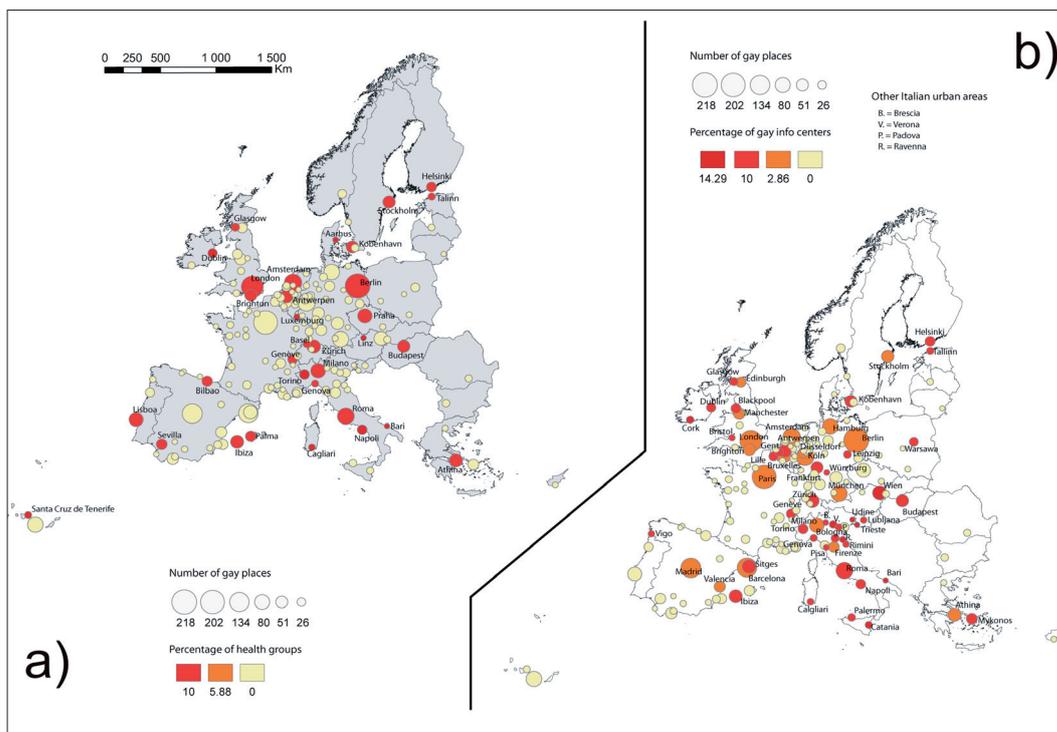
Fig. 5: a) Percentage of health groups in the total number of 'gay places' per urban area in the EU, Norway and Switzerland in 2007; b) Percentage of gay info. centres in the total number of 'gay places' per urban area in the EU, Norway and Switzerland in 2007. Sources: Spartacus Gay Guide (2007); made with Philcarto: http://philcarto.free.fr

countries in the European Union), or is this evidence of an increased willingness to be more visible to their target audience? Could their higher number be a sign of a greater need for more LGBT[13] rights in Italy? It should also be considered that in Italy, gay groups are playing an equivalent role that associative gay bars did in other Western countries in the 1970s and 1980s, perhaps as a tool for the construction of gay visibility and acceptance in the wider society.

The Italian results are significantly different enough that we may interpret them by a larger set of arguments which applies also to discussion of CP1 results. We need to consider a broader field of the economic, cultural and societal factors that are involved here (Fig. 6). These factors should be discussed as background to our data (CP1 and CP2), as they reflect and impact the development of gay places.

Every nation, every region and every society has more or less different historical experience, some countries developed democracy later some sooner, some regions were rich in natural resources, etc. In short, some societies are more liberal about LGBT issues than others. Inglehart (2006) has connected this to the wider trend of transition from material (conservative, traditional and insecure) to post-material (more secure and liberal) values in societies. Interestingly, many LGBT sociological and activist reports agree (COE, 2011; FRA, 2008, 2009, 2010; EC, 2009; ILGA, 2013), and use societal values for explaining different attitudes[14] in different regions. Without straying into deeper discussion of these issues, we should be aware of certain historical pre-conditions (history of law and medicine) connected with these attitudes towards non-heterosexuals: for example, how long homosexuality has been decriminalized in the country (Waaldijk, 2000), or when it stopped being considered as a disease by practitioners. The 'societal image of homosexuality' is impacted, hence it affects the 'strictness of heteronormativity'.

Other conditions, such as the prevalence of 'traditional religious, national and familial values' are also important.

The presence of strong orthodox religious discourse in a society may prefer certain heteronormative or discriminatory interpretations of sacred texts (COE, 2011). Similarly, some national discourses connected to 'ways of living your life as a proper citizen' may be connected to norms in sexuality, but also to 'accepted ways of family building', with an inclination to policing 'stereotypical' feminine and masculine gender roles in women and men. Moreover, if there is no anti-discriminatory legislation addressing sexuality and gender discrimination in the region, then even media, politicians or other opinion makers may (re)produce discourses which reinforce regional heteronormativity. This therefore impacts the security and comfort of non-heterosexuals. The structure of gay places may then be seen as a mirror to these conditions, combined with other wider regional economic and political conditions.

In the case of Italy, then, it is plausible to interpret the differences which are clearly in contrast to the other European countries, using some of these factors. Firstly, Italy has, to date, enforced only very limited anti-discriminatory jurisdiction (COE, 2011; ILGA, 2013). Secondly, the Vatican has a strong geographical position in the south of the country and in Rome, but its influence extends over local media as well. Thus far, neither the Catholic Church nor the Pope has showed any liberal progression in attitudes towards homosexuals. Moreover, societal reports (COE, 2011) rank Italy among the most traditional (in the foregoing sense) of European societies (together with Albania, Greece, Montenegro, Russia and Ukraine). On the other hand, as quite visible from the discussion of CP1, Rome is an important entrepreneurial capital (together with Milan, Florence, Venice and Bologna) and shows up as being more liberal. In general, we believe that it is therefore much less comfortable to be visibly 'gay' in an Italian city than in similar cities in Germany, UK or Spain, even if less comfort in the visibility of gayness does not necessarily prevent a person from finding other ways of performing one's gayness.
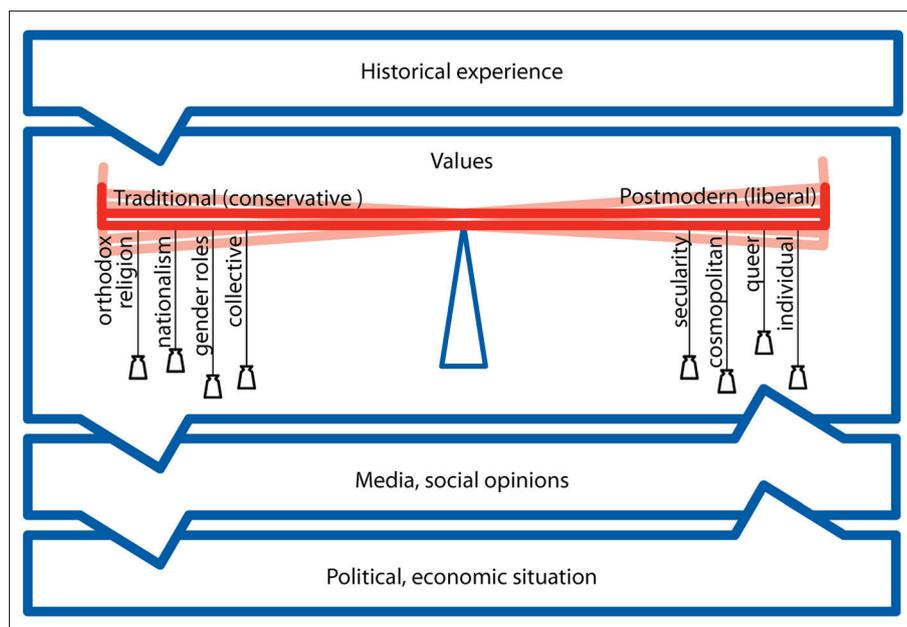

Fig. 6: The wider field of economic, cultural and societal factors behind the foundations of heteronormativity
Source: authors´

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[13] LGBT is an acronym used to refer to lesbians, gays, bisexuals and transgender people.

[14] For example, attitudes to discrimination of sexual minorities or towards LGBT people in general.

A recent study by Nadine Cattan and Alberto Vanolo (2011) is useful in addressing some of these issues. The authors evaluate lesbian night-time events in Paris and 'GLBTQ nights' in Turin (Italy), and explain part of the invisibility in the case of Italy as one of "ephemeral and temporal spaces". Such events "are performed in temporary places that are in clubs that, for the rest of the week, are intended for other customers and for different sexual identities [heterosexual]" (Cattan, Vanolo, 2011).

Furthermore, these authors described the Turin "GLBTQ scene" as follows: "…*In Turin there are basically not 'fixed' GLBTQ discos and clubs, but just particular thematic nights (apart from three gay-friendly bars). Currently, mainstream GLBTQ events take place every Friday, Saturday and Sunday nights, organized by different associations, while minor events take form in residual and 'alternative' spaces. The spatial presence of the gay commercial spaces is therefore limited to certain times, and dispersed in the city space, so there is nothing like a 'gay area'.*"

Even though these gatherings are temporary, they act like spaces of empowerment, enabling LGBT people to dream and live reassuring emotions in the space and time period between the parties. This leads to the assumption that local Italian gays' sociability occurs in different ways, compared to other European cities, where gay districts (or gay villages) are often located in town centres and are therefore visible. These observations echo those of Luigi Mosca's[15] about southern Italy – that local associative initiatives are more successful in touristic coastal areas when such initiatives can enjoy more visibility than in core areas. Therefore, in Italy, gay sociability occurs more in touristic areas like beaches, or in gay-friendly spaces like discos and clubs, characterised by greater degree of fluidity when it comes to the definitions of sexual identity.

Following the Spartacus Gay Guide, health groups give information in particular about AIDS. There are few European cities where such groups are mentioned. Interestingly, Italy has the highest number of cities that have such health information facilities. We are not able to explain this overrepresentation of health groups in Italy, however, apart from the previous questions raised about gay groups in Italy in general, such as the willingness of Italian gay groups for greater visibility.

The analysis of mapping the scores of the second component using the observed distribution patterns across the EU, Norway and Switzerland may now be discussed. This map (Fig. 4) generally sets German cities – regardless of their hierarchical position and where bars are overrepresented in the 'gay places' structure – in opposition to Italian cities, where gays bars are underrepresented. Most of the other seaside resorts also have negative scores on CP2, except for Las Palmas (Canary Islands, Spain). These values can be explained by an overrepresentation of cruising places (beaches) in these locations or by an underrepresentation of bars. Geographers, for example Emmanuel Jaurand and Stéphane Leroy (2008), have pointed to the role that Mediterranean beaches have played in homoeroticism and gay sociability, particularly as the cultural inheritance of Ancient Greece. This point strengthens an interpretation of the CP2 as a gay sociability component.

Some well-equipped capitals such as Prague, Budapest, Tallinn are negatively correlated with CP2, and this signifies that their commercial structure is less dominated by bars. Similar results with negative CP2 numbers can be found for Dublin and the other Western European cities, Scandinavian capitals, and for Athens, Bucharest, Vilnius and Warsaw. Finally, Bratislava, Sofia, Riga and Luxemburg, however, show an opposite situation, with slightly positive scores at CP2.

This can be interpreted as the limited visibility of homosexuality in these countries – either due to a greater acceptance of homosexuality in the wider society as in Scandinavia, UK or Benelux, or in contrast due to 'stricter heteronormativity' and the more conservative orientation of other countries (Slovakia, Bulgaria, or Latvia). Even in less accepting regions, however, where gay culture remains mostly invisible, non-heterosexual people are present and develop strategies for living out their sexuality socially. Anthropologist Liselotte van Velzen (2004), in her study on Belgrade, pointed out that such strategies include passing[16] as straight or migrating to cyberspace[17] to preserve anonymity. These strategies, however, maintain these homophobic economic and social environments largely uncontested.

In such situations, the Internet plays an important role as it enables communication between and within sexual minorities – and subsequently allows 'empowerment', since every otherwise spatially isolated individual can experience a (virtual) gay community and feel strengthened in their gay identity construction. The Internet can be viewed as well as an important factor influencing the very existence of gay places, such as venues, by reducing their number or making them invisible in the urban space. This hypothesis is corroborated by the findings of Brad Ruting (2008), who studied the economic transformation of gay spaces in Sydney, finding that the Internet is an important factor. This hypothesis may also partially explain why gay bars do not dominate cities and activist networks in Bulgaria or Romania, where local societies are rather 'traditional' – even though they are networked.

Generally speaking, the CP2 dimension may be interpreted as showing the local conditions of gay sociability (i.e. semi-public places where many forms of gay sociability may occur regardless of visibility). This finding calls for a discussion of gay (in)visibilities as they may also be proposed as an interpretation for the CP1 dimension, since it opposes cruising places (invisible) which have the highest correlation on it. Nonetheless, one should keep in mind that bars, as the penultimate indicator of gay visibility, have their best correlation on CP2, and not on the primary CP1 dimension.

6. Discussion: Challenging gay (in)visibilities in Europe

An important basis for discussion of the socio-spatial organization of gay lives is the European survey on discrimination in the EU, conducted in 2009 (European Commission, from now on EC 2009). Some results of this survey deserve a closer look with regard to the '(in)visibility' axis of 'gayness' in Europe, and thus to the interpretation of CP2.

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[15] MOSCA Luigi, Ph.D. Anthropology, Universita Degli Studi and Université de Bruxelles, interviewed on 02/08/2012

[16] Shifting sexual identities, i.e. performing gay identity only with gay-friendly friends, while passing as straight or behaving inconspicuously when in public spaces.

[17] Internet chat rooms, etc.

The 2009 survey underlines the relationships between gay invisibility and perceived discrimination towards LGBT people. It clearly shows that the lower the perceived discrimination in a country is, the lower is the percentage of people who have friends among homosexuals. This may be an illustration of a reaction where people who do not rate sexual discrimination as an important societal challenge, do not notice it and may even deny its existence as they do not have any LGBT friends or relatives. Consequently, this leads to lower perceived discrimination in ascending EU states (Bulgaria, Czech Republic (both at 22% of the surveyed citizens), Slovakia (27%) and Estonia (28%). Such results are surprisingly below the EU average (47%). Therefore, it can be suggested that the survey data are indicating the results of ignorance towards homosexuals rather than perceived discrimination.

The survey also describes a decrease in the perceived extent of discrimination throughout the EU (compared with a 2008 survey), but it is still seen as particularly widespread in many of the Mediterranean countries (Cyprus: 66%, Greece: 64%). Furthermore, Italy and France, both with 61%, show results far above the EU average of 47%. The report also underlines the situation in the Netherlands where discrimination on grounds of sexual orientation is thought to be growing. This development can be linked to an increased incidence of attacks against LGBT people there in recent years. At the same time, significantly fewer citizens in Italy and the UK now believe that 'discrimination on grounds of sexual orientation is widespread in their country' than what was recorded in 2008. If we examine the averages on the comfort scale from 1 to 10, the results of this survey reveal that people in Sweden (8.7), Denmark (8.4) and the Netherlands (8.2), are the most comfortable with having a LGBT leader in their country, while people in Bulgaria (3.2), Romania and Turkey (each 3.4) report feeling the least comfortable (EC, 2009).

Another study, conducted by Norwegian researchers (Røthing, Bang, 2010), explains how difficult it can be for LGBT youth to accept their homosexuality, even in a country as tolerant as Norway[18]. Disturbing linkages between homophobia (or heteronormativity) and suicidal behaviour in youngsters had been reported. The authors (ibid. 2010) explain this paradoxical situation as the result of the lack of "non-heterosexual future-scapes" offered in school and in society in general, creating young peoples' fear of being or becoming homosexual (homo-negativism). On the other hand, Norway has a marriage act that states the equality of homosexual and heterosexual relationships. The authors argue, however, that "many of those who support the law and the rights of lesbians and homosexuals do not necessarily find homosexuality as desirable or as worthy of being promoted as heterosexuality" (ibid. 2010: 160).

This 'homo-negativism', or maybe better 'strict heteronormativity', is occurring also in other European countries with egalitarian legislations like those in Scandinavian countries, and we believe that in part this may explain the remaining gay invisibility in some regions of these countries.

As outlined above, some wider field of economic, cultural and societal factors is involved, specifically that connected with 'traditionalism' and 'liberalism' in people's values, and we will extend these arguments a little further (see Fig. 6,

again). As in the case of Italy, the strong position of the Church seems to be important for the preservation of 'conservative and traditional' discourses. We are convinced from these data that a religion's position or opinion is of utmost importance with respect to gay visibility and the existence of gay spaces, in general, and not only across the EU.

Clearly, religion is most important here, but it would be incorrect to see it simplistically as an epitome of intolerance or even hate: religions as ideologies cannot be generally dismissed as intolerant or rejectionist. Clear differences may be thus identified in European countries, where the major religion is Christianity. First, Scandinavian countries together with most of the western European countries, are predominantly Protestant. Protestantism has been shown to adopt the most liberal or progressive attitudes towards homosexuality (Štulhofer, Rimac, 2009). Perhaps also due to this factor, it is possible for homosexuals to get married in churches there (e.g. in Denmark or Sweden). A variety of southern and central European countries are mostly Roman Catholic (e.g. Poland, Slovakia, Hungary, Spain, and Italy). Here Italy is additionally influenced by the position of the Vatican State, as discussed before. Lastly, most eastern European countries are predominantly Orthodox: perhaps the best example is Russia, where the contemporary worsening situation of LGBT rights illustrates not only the conservative attitudes of the Orthodox Church, but also its conjunctions to the state. In spite of the fact that Russia is not a member state of the EU, it has a profound impact on political and ideological development in most of the Eastern European region. Štulhofer and Rimac (2009) give good examples of these religious and cultural influences in more detail. Even though more religious countries show lower scores for gay presence (lower numbers of gay bars: see Fig. 4b) and visibility, causality between religious structure and homosexuality is much more complex and deserves further investigation. Despite these facts we conclude that the impact of religions is somewhat traditional and plausibly reactionary towards gay (in)visibility.

7. Greater gay acceptance in wider society

In presenting the results of cities on the CP2 dimension, we distinguished two groups of cities connected with negative CP2 results and therefore to gay (in)visibility. The first group was connected to invisibility largely because of the previously-mentioned factors connected to general heteronormativity (Bratislava, Sofia, Riga, etc.). For the second group (Scandinavian capitals, some Western European cities, Prague or Budapest), we implied that promotion of liberal values in their societies might cause lesser need for exclusive socializing in 'gay bars', hence less demand for them. This is an interesting 'trend' to elaborate.

Our own observations in Prague, Budapest and Copenhagen indicate that the development of gay visibilities does not necessarily show in the form of signposting gay symbolism, such as rainbow flags or stickers in front of businesses. In Prague, gay people are becoming more and more visible in spaces which are not labelled by 'gay exclusivity', and this may in turn lead to reducing the need to open a gay bar. As a result of this, the niche market which capitalizes LGBT clientele might also be weakened as a result of choice instead of necessity.

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[18] According to the ILGA-Europe Rainbow Europe Index 2013 report, Norway is second to the UK as the most sexually equal country in Europe.

We find it useful to juxtapose the progressive commodification strategies with slow but growing acceptance of LGBT people. The phenomenon of an increasing acceptance of a diversifying society, where the previous state was dominated by gay exclusivity, can be named 'de-gaying', and this holds especially true for Copenhagen. Danish people are one of the most tolerant in the EU (EC, 2009; EU LGBT survey, 2013). This country was, for example, the first to introduce registered partnerships in 1986, and had founded an LGBT organization originally in 1948. This process of 'gayness' integration in wider society now makes 'exclusive' (i.e. visible or marketed) gay clubs economically and socially obsolete. Despite the positive reading of this, the term 'de-gaying' is used by many authors in a rather negative way (Whittle, 1994; Collins, 2004), when they are addressing a wider assimilation of 'gayness' into a commoditized cosmopolitan culture, when consumable 'appropriate gayness' has become an urban spectacle (Rushbrook, 2002). It would be, therefore, naive to read the recent changes in gay visibilities as a result of the sole growing acceptance of gays and other sexual minorities.

Many cities in Central Europe, including Prague, have communist legacies, which at least to some degree succeeded in lowering the social differentiation process, consequently with the drawback of making homosexuality a taboo. Thus, no 'explicit' gay clubs existed during the communist era. Although the contemporary Prague 'gay scene' is slightly over-equipped (CP1), its future existence may eventually become unimportant, even when the commodification of 'gayness' is in its early phase there. On the one hand, new types of gay businesses are appearing (gay travel agencies, etc.) and on the other, these market potentials may diminish with the rise of societal acceptance. Therefore, the existence of gay venues can be seen as complex, and the commodification processes favouring capitalisation or exploiting the unequal situation of homosexuals have to be further problematized, especially at the present time of a continuous liberalization of cultural values.

Concluding the issue of gay (in)visibilities, we would like to include a short anecdote that took place in Prague. It represents a good example of what 'gay (in)visibility' can be and how problematic it is for researchers to measure it. On Christmas Day 2012, a family (mixed-sex parents with two children) visiting Prague, entered a gay men bear[19] bar for a moment, while not knowing exactly what kind of bar it was and then leaving the place after realising that it was a gay bear bar and not a place they intended to visit. This short experience of less than two minutes might be considered as a proof of gay (in)visibility in Prague, because this bar is easily accessible to everyone. At the same time, one may argue that bar was not 'visibly gay enough' in the public space, and that this is the reason why the family did not initially hesitate to enter. Furthermore, the tiny rainbow sticker on the front door was probably not seen or interpreted as an indication of an LGBT venue. So, if gay symbols are only recognizable by gay people and not by the wider population, this may to certain extent explain the somewhat still limited co-existence of heterosexual and non-heterosexual cultures. This experience may indicate that gay facilities' (in)visibility needs to be studied from several perspectives, including direct observations (e.g. crowded places, or not from outside, presence/absence of rainbow flags) and coming from gay patrons' and non-patrons' perspectives and from straight people's perspective. This cross-perspective analysis would be helpful to describe gay (in) visibilities in Europe beyond their general contexts.

8. Conclusions

Quantitative methodology enables researchers to look beyond simple or multiple indicator data. We believe that we have shown that, even in a field largely dominated by qualitative methods, the geographies of sexualities can be studied by quantitative methods. Quantitative tools do not have to strive for generalizability or universal validity, but they can complement other methodologies in dialectical paths to understanding.

Principal Component Analysis (PCA) was used for an analysis of data from the Spartacus International Gay Guide of 2007, which made it possible to study gay facility structures and places in the largest cities of the European Union, Norway and Switzerland. We wanted to understand the nature of the underlying economic, cultural and social factors which affect the existing structure of various European 'gay places'. PCA has helped in reaching beyond the 'factual data', producing two new components (CP1 and CP2) with characteristic functions which allowed for a further investigation of this underlying structure. The first component (CP1) has been interpreted as a comfort, touristic or commodification axis, whereas the second component (CP2) shed some light on the complex conditions of gay sociability, and specifically on gays' cultural (in) visibility, taking the touristic or commodification dimension – as accounted for by the first component – into account.

This study offers some explanations for gay (in)visibilities in Europe, since it might be also a valuable interpretation for CP2, as gay sociability may occur visibly and invisibly. Plausible explanatory factors for CP1 and CP2 include historical experience and political background (LGBT legislation, such as (de)criminalization or protection against the economic situation, market economy, commodification, tourism, etc.), and other societal or cultural conditions (traditional vs. liberal values). These factors have to be understood in relation to other factors influencing broader concepts such as religion, nationalism, etc., or mirroring them through media, politics and opinion makers. It is then a whole 'web' of factors that affect levels of gay acceptance, and gay cultural development either in space-time or in the cyberspace.

We believe that the PCA methodology used in this research has shed some light on the distribution of gay spaces and places, but we have to be aware of some connected analytical limitations. The two components examined account for some of 57% of the variance in the original set of 27 variables (i.e., the information available from the data set), and therefore some important factors still remained hidden to us. In order to describe gay facilities' visibility in more detail, we suggest that conducting a multi-actor (residents, tourists, activists, city planners, municipalities, etc.) qualitative or mixed analysis should be designed. This quantitative study of 'gay places' in the largest European cities focused mainly on a national and macro-regional analytical perspective, which could be complemented in the future with smaller-scale surveys. Our main goal was to utilize a standardized database which allowed for

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[19] Though a closed definition of « bears » does not exist, the term can be said generally to refer to gay or bisexual men with a good deal of body hair (Textor, 1999).

a comparative viewpoint. Even though this study explicitly focusses only on gay males and venues catering to them and was not meant to engage in a refined critical discussion of queer theory, the authors believe that the results and issues from this discussion are of a character that also influence cultural attitudes towards homosexual women and the other non- heterosexual people in general.

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SHOPPING AND SERVICES RELATED TRAVEL
IN THE HINTERLAND OF BRNO:
CHANGES FROM THE SOCIALIST PERIOD TO THE PRESENT

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Abstract

Shopping and services related travel represent significant aspects of the service functions of settlements and belong to basic region-forming processes. They are relatively irregular movements, and the analyses of these processes are based on data which are not available from official sources. This article presents some results from a survey on the attraction of retail and services provision, as exemplified by service processes in the hinterland of Brno City. The results from our survey contain both a time dimension in a single-model space (in terms of a comparison between current results and those from the socialist era at the end of the 1970s), and the possibility to compare various methodologies using responses from municipalities and those from local residents. Hence, this article presents an outline of selected changes in the shopping resources and shopping and services related travel in the Brno hinterland, over a period of about three decades, with some interesting methodological aspects.

Shrnutí

Spádovost za obchodem a službami v zázemí Brna: srovnání období socialismu a současnosti

Dojížďka za obchodem a službami představuje významný aspekt obslužné funkce sídel a lze ji považovat za jeden ze základních regionotvorných procesů. Jedná se o pohyb nepravidelný, jehož analýzy jsou vázány na datovou základnu, která je z oficiálních zdrojů nedostupná. Příspěvek představuje vybrané výsledky šetření spádovosti obyvatel za obchodem a službami na příkladu obslužných procesů v zázemí města Brna. Výsledky šetření mají jak časovou dimenzi v jednom modelovém prostoru (srovnání výsledků z konce 70. let s aktuálními), tak nabízejí možnost srovnání odlišných metodických přístupů (odpovědi reprezentantů obcí a odpovědi místních obyvatel). Je tedy možné sledovat vybrané změny nákupních možností, resp. spádovosti za obchodem službami v horizontu zhruba tří desetiletí.

Keywords: retail and services gravity, service processes, questionnaire survey, Brno hinterland, Czech Republic

1. Introduction

Linkages between places of residence and the locations of facilities providing retail and service functions are basic socioeconomic relationships, and travelling for retail and services can be considered one of the basic region-forming processes (see, e.g. Hampl et al., 1978). Compared to commuting to schools, which are regular movements, these are relatively irregular movements of inhabitants (e.g. Anděl, Bičík, 1980), and an analysis of the factors influencing such journeys is limited by available data. The shortage of suitable data about travels for shopping and services (there is no centrally-controlled acquisition process for such data) makes any detailed study of these mobility processes difficult.

Travelling for retail shopping and generally for services represents a significant aspect of the service function of settlements (Haggett, 1965; Berry, 1967). Retail facilities in settlements determine the size of the serviced area and other functional parameters of the territorial service-providing systems. In contrast to commuting for jobs and schools, data on travels for retail shopping and services are not available from any official statistical source because they are not collected within the national population survey. To be able to evaluate this phenomenon and compare changes in retail gravity, travel directions, influence spheres and centre attractiveness powers (both settlement and retailing

centres), it is necessary to conduct repeated surveys, most frequently in the form of questionnaire surveys and interviews. These methods make comparisons possible but, on the other hand, the current state of the spatial organization of the retail network cannot be compared with the situation of say 25 years ago, due to the emergence of new retailing concepts and their impacts on the shaping of consumer behaviours (Maryáš, 1988; Kunc et al., 2012a,b,c).

In this article we present the results of a survey concerning the retail and services gravity as exemplified by service processes in the hinterland of Brno city – within the territory of the current Brno-Province district. Besides the analytical outputs and evaluations of partial surveys, we compared the following:

- changes in the attraction area of retailing and service centres in the time period between 1979 and 2011; and
- the results of two related, yet different survey methods – acquiring survey data from the municipality representatives (mayors, secretaries, etc.) and from the inhabitants.

The many shopping centres and large hypermarkets on the outskirts of cities, which have been influencing service processes in the hinterlands of most large cities for many years, represent a significant aspect of the changes in the retail and services gravity.

2. Theoretical background

Methodological approaches based on interaction models and data from questionnaire surveys were used to define the hinterlands of retailing and service centres, i.e. to establish the regionalization of services. Gravity models and intervening opportunity models are among the most frequently used interaction models (e.g. Isard et al., 1998). The gravity models started to be used for defining the catchment areas of shopping or service centres in the 1920s when, using data from a questionnaire survey conducted in Texas, Reilly (1929) defined the so-called Retailing Gravitation Law – later called Reilly's law of retail gravitation. Under normal circumstances, two cities, which are retailing centres, attract shoppers from the surrounding communities in direct proportion to the sizes of populations of these two cities and in indirect proportion to some power of distance from each of these cities to the surrounding communities.

Later developments resulted in the establishment of a probabilistic concept and in increasing the number of centres, since Reilly's original model allowed for the division of a territory from two centres only. Generalization of variables followed: for example, rather than the number of inhabitants in the settlement, Wilson (1974) established a so-called production variable, basically representing the level of demand in the settlement, and a so-called attractiveness variable, which is a level of demand in the centre; and distance was replaced by a generalized travel function. Huff's model (1964) or rather its simplified version that belongs in the limited gravity model group, has been most often used for analyzing Central European settlements. In this model, the attractiveness variable is replaced by an alternative variable, e.g. by the number of service facility types, the number of people employed in retailing or in services, shop floor space or retail turnover (see, e.g. Maryáš, 1983).

There are not many studies in the available scientific literature that deal directly with defining catchment areas according to actual travel for services. In his study, one of the classic works, Berry (1967) focused on the catchment areas for services as exemplified by retailing centres in selected U.S. cities. Later he attempted to generalize his findings with respect to other regionalization tasks. In the mid-1980s, Wee and Pearce (1985) used Huff's retail gravity model in connection with customer behaviour in the shopping zones of Canadian cities. Löffler (1998), pointed to different shapes of distance functions for various centre sizes; he also provided a detailed overview of available input data for Reilly's model, specifically mass- and distance-related data. Fotheringham et al. (2000) and Wilson (2010) represent more recent work, expanding upon the theoretical starting points and the historical development of spatial interaction modelling, including possible future utilization.

The Czech specialized literature discussed Reilly's model in the work of the former Commerce Research Institute: for example, Hebák et al. (1972) analyzed the model's variables in detail. Maryáš (1983, 1988, 1992a,b) critically evaluated the methods used to define the retailing centre influence spheres, especially in association with the validity of the original models in the territory of Czechoslovakia, where the conclusions established according to the studies of Brno and Prague hinterlands agreed with foreign experience. After a long pause, Řehák et al. (2009) discussed and introduced model examples of regionalization in the Czech Republic and Slovakia using Reilly's model and its various

versions. Hubáčková and Krejčí (2007) used Reilly's model for assessing the regional impact of the ethnographic region of Slovácko. Halás and Klapka (2010, 2012) and Kraft and Blažek (2012) drew attention to the possible application of Reilly's model to more general and current research topics, besides retailing.

The following methodological approaches can be used for selecting the service sphere centres and for assessing their hierarchic levels, according to Smailes (1967) and Scott (1973), as quoted in Maryáš (1983):

- defining the centres according to data on the functions, capacity and utilization of retailing and service facilities in settlements - so-called static characteristics based on data commonly gathered by survey bureaus; and

- defining the centres according to the size of serviced areas, i.e. according to service processes between settlements – so-called dynamic characteristics based on data from questionnaire surveys of population attraction to settlement service facilities.

Two methods are used to define centre influence spheres according to the questionnaire surveys:

1. survey of selected facilities of the service sphere of a selected centre (e.g. Wokoun, 1983, and more recent works by Szczyrba, 2002; Kunc et al., 2011); and

2. surveys in all settlements of the area under investigation (e.g. Maryáš, 1988, and more recent works by Kunc et al., 2012b,c,d).

Most older studies based on questionnaire surveys claimed that almost every hierarchical level contains a zone of intense interaction, a zone of weaker travels, and an oscillation zone (Berry, 1967), and this is true today as well (Maryáš, 2010). When conducting a survey in the selected facilities of a centre, though, it is difficult to establish criteria determining the range of the catchment area and the intensity of the bonds. Questionnaire surveys of retail and service gravity represent a time-consuming and logistically demanding method, which is therefore not used frequently. This method strives to describe the essential functional characteristics of the intra-city and peripheral centres of retailing facilities and other types of shopping centres, and to generate their spheres of influence (e.g. Marjanen, 1995; Thomas and Bromley, 2003; Mitríková, 2008; Trembošová, 2009; Wagner, Rudolph, 2010; Kunc et al., 2012b).

In defining the catchment areas of commercial units, hypermarkets and shopping centres located in inner cities or in a city's outskirts, have been used for research in the past twenty years. Attention has been given not only to various spatial and social aspects of daily and non-daily attraction of inhabitants in cities and their hinterlands to the shopping units of various types, but also to the influence of newly-built retailing centres on the relationship between the city centre and the periphery, i.e. to changes in retail gravity and the shopping behaviours of customers.

Formerly, using specific examples, researchers tried to describe the shopping behaviour model of the population with respect to the selection of shopping places (Timmermans et al., 1982; Coshall, 1985). Retail gravity, consumers' shopping behaviours and their interactions, became the most frequent types of research. Marjanen (1995) published a time-space comparison of shopping relationships and shopping behaviours of inhabitants in the Turku agglomeration at two time horizons at the beginning of the 1990s. The study demonstrated that the relationships between retail gravity and shopping behaviour had changed less than expected

for the specific period, despite the fact that the transition towards shopping in shopping centres at the edge of the city was quite apparent. Louviere et al. (2001) compared similar interactions in some USA, Canada and Norway cities in three time periods and, among other things, they pointed out the greater dynamism of these relationships in America. Thomas and Bromley (2003) analyzed the relationship between the building of new retailing units in Llanelli city centre (South Wales) and changes in the travels of inhabitants for shopping and services, within the context of a potential revitalization of the city centre. They also criticized the low efficiency of urban planning. Crosby et al. (2005) described the English town of Reading as an example, where the construction of a shopping centre, The Oracle, resulted in a significant regrouping of retailing relationships between the city centre and its periphery.

New forms of shopping behaviours in shopping centres located in a city environment, i.e. specific forms of behavioural implications, are discussed by Spilková (2003) for a Prague shopping centre. In their case studies of Slovak cities, Mitríková (2008), Križan et al. (2009) and Trembošová (2010) focused on interactions between retail gravity and shopping behaviours. Wilk (2005) and Namyślak (2006) characterized the retailing environment in Poland using selected cities. The study by Dudek-Mańkowska and Križan (2012) presents a Polish-Slovak comparison of the spatial aspects of shopping centre localization in Warsaw and Bratislava. McEachern and Warnaby (2006) studied the issue of intense travels for shopping food products in a rural region of western Scotland, and arrived at a distance of approximately 32 km. Even before that, Smith and Sparks (2000) analyzed, also in Scotland, the general problem of preserving small independent shops in rural regions. The shift of shopping bonds between the cities and countryside towards the cities, or rather towards their peripheries, has been confirmed also by Leeuwen and Rietveld (2011), who demonstrated for five European countries that most households living in the city hinterlands do their shopping in the cities.

Large-scale surveys conducted as a part of the studies published by Kunc et al. (2012c, 2012d, 2012e) demonstrated the significant influence of new suburban shopping centres in the Czech Republic, specifically for the case of the Brno city agglomeration. It is not only the influence of travel distance and place of work on the intensity and frequency of both daily and non-daily shopping travels within an urban space and hinterlands (the resulting intense travel distance was similar to that published by McEachern and Warnaby, 2006), but also of a rather unique change in the shopping behaviour of the whole Czech population in connection with the attractiveness and offer of the new shopping centres. The attractiveness of shopping centres for many types of shoppers does not have to do with the population in the Czech Republic (see also Spilková 2012b) only; it has been confirmed by many studies from other countries as well, where this phenomenon had appeared several decades before (Underhill, 2004; Teller, 2008; Jackson et al., 2011, and many others).

In harmony with the above-presented theoretical background, we established the following research hypotheses:

• Brno city, as a regional metropolis, has increased its significance within the reach of its service area at the expense of smaller traditional centres;

• a growth in reciprocal contacts could be expected between the centre (Brno) and its hinterland, and the establishment of new local service centres with their own small hinterlands; and

• a significant decline in daily shopping (foodstuffs, drugstore goods) at the place of residence, especially in municipalities with the lowest population numbers, could be expected between 1979 and 2011, in connection with changes in rural areas in the past twenty years.

3. Research methodology, data, and research area

Analyses of retail gravity for population samples are not common, and when they were made in the past (e.g. by the Commerce Research Institute in Prague, Charles University Prague, Geography Institute of the Czechoslovak Academy of Sciences, Brno), then they were carried out in limited model territories only. The previous most complete survey of population attraction to communal facilities was performed by the Institute of Geography of the Czechoslovak Academy of Sciences in the territory of the Czech Republic at the end of the 1970s, and in the territory of Slovakia, in cooperation with the Institute of Geography of the Slovak Academy of Sciences, in 1978. This survey was conducted through municipal and local national committees, whose secretaries were questioned about the primary and secondary destinations of the settlement's inhabitants when shopping for basic foodstuffs and drugstore goods, common textiles and footwear, industrial goods (electrical appliances), medicines, books, furniture, special goods, and common and special services. On the basis of the above-mentioned surveys, Maryáš (1988) defined basic service regions, which represented a framework where supra-local service processes were relatively enclosed; these processes included shopping for common textiles and footwear, common industrial goods, medicines, books, furniture, and common and special services.

This questionnaire survey methodologically followed the above-described surveys of inhabitants' mobility for services conducted in 1979 and the scope-limited survey conducted in 2004–2006 in the territory of Moravia by Palacký University in Olomouc and Masaryk University in Brno. Questions were constructed in a way that would allow for comparative analyses of those two time horizons (see Tab. 1).

The current survey was conducted through the system of municipal authorities: mayors or their secretaries were questioned about main, partial and exceptional destinations of the municipality's inhabitants in the above-specified processes. The territorial extent was chosen to cover the contemporary Brno-Province district, which is the nearest service hinterland of Brno (see Fig. 1). The survey was conducted by members of the author team and by graduates and post-graduate students of Masaryk University. Representatives of the municipal authorities

Fig. 1: Research area. Source: authors´

Need	Name of the center visited		
	Prevailingly* (regularly)	Sometimes (less frequently)	Exceptionally (very rarely)
Daily shopping (foodstuffs, small drugstore goods)			
Purchases of common textiles and footwear			
Common services (barber´s, hairdresser´s, clesner´s, shoe repair´s, a.o.)			
Visit to pharmacy			
Purchases of industrial goods (e.g. electric appliances, washing machines, refrigerators, a.o.)			
Purchases of books and records (CDs)			
Purchases of furniture			
Special services (photography, watchmaker´s, dress maker´s, tec.)			
Purchases of special goods (jewelry, choice textiles, footwear, car accesories, a.o.)			

Tab. 1: Questions in the questionnaire survey for municipality representatives (years 1979 and 2011)
*The inhabitants satisfy their needs in one centre. If there is no prevailing direction of travelling for services, fill in the „Sometimes" and „Exceptionally" columns only (you are encouraged to mention 2 or more centres)
Sources: Maryáš (1992a,b); authors' survey

were contacted first by email, then by telephone and some of them were visited personally. This survey was conducted in the first half of 2011.

After performing the analyses of service processes, only those processes with utilization frequencies representing a particular hierarchical level, were selected for defining the service catchment areas. Here we tried to follow the previous survey of 1979, assessing only the shopping for textiles and footwear, industrial goods (electrical appliances), medicines, books, furniture, and common and special services. (Daily and special goods shopping was included in the questionnaire survey but not incorporated in the methodology for establishing the subgroups of service processes and their assessment; yet it was used in the subsequent analysis).

The selection of service centres was largely based on the original methodology of the service centre catchment area selection in the former Czechoslovakia (Maryáš, 1988), which, after performing the analysis of distances up to which the travels for shopping and services occur and after establishing the share of municipalities listed as the main destinations of travels within the service processes, defined the criteria for determining service centres based on the regional scope. The condition that a municipality should be listed as an unambiguous (main) destination of travels for at least one municipality in the above-analyzed service processes, was selected as satisfactory.

We followed the original methodology (Maryáš, 1988) when defining the influence spheres of the service centres as well. Answers in the questionnaire survey were assessed as follows: travels to centres were categorized according to the attraction intensity into the following three types: prevailing 10 points, sometimes 5 points, and occasionally 1 point. For individual localities, each destination i reported by the municipality in the particular service process j, was assigned a v_{ij} value determining a relative significance of the i-th destination for the reporting municipality in the particular service process:

$$v_{ij} = \frac{T_{ij}}{PC_{ij} \cdot PT_{ij}} \cdot 100$$

where

T_{ij} = point value of the attraction type into the i-th destination in the j-th service process;

PC_{ij} = number of destinations within a particular type;

PT_{ij} = sum of point values of all attraction intensity types indicated by a municipality within the j-th service process.

The sum of the vij values in each municipality was equal to 100% for each service process j. A k_j coefficient was assigned to each service process depending on its significance, or rather the frequency of use. Total relative significance cv_i of a destination i for the particular municipality from all assessed service processes then equals:

$$cv_{ij} = \frac{\sum_j v_{ij} \cdot k_j}{\sum_i \sum_j v_{ij} \cdot k_j} \cdot 100$$

It holds once again then, that in each municipality $\sum cv_i = 100\%$.

Evaluation of individual services from the frequency of use standpoint, and therefore determination of the importance of a process for satisfying the population needs, was the main problem when defining the spheres of service centre influence. We based our assumptions on the numbers of indicated destinations, provided that the highest number of destination municipalities was indicated for the most frequently used communal facilities, i.e. for the most significant and most frequently used service processes (see Maryáš, 1988).

According to the analysis of the main destinations (i. e. destinations listed as prevailing places of shopping), the service processes were subdivided into groups and these

groups were assigned different coefficients for further evaluation. Each coefficient was determined by the ratio between the number of the main destinations of travel for book shopping; purchases of these goods had the lowest number of main destinations of all the studied service processes in the territory of the Brno-Province district. The ratios were as follows: *books shopping : furniture shopping : common industrial goods shopping : special services : textile and footwear shopping : visit to pharmacy : common services = 1 : 1 : 1.5 : 1.6 : 1.6 : 2.1 : 3.2.*

The service processes were then subdivided into four groups:

- coefficient 1 – books, furniture shopping,
- coefficient 1.5 – textile and footwear shopping, industrial goods shopping, special services,
- coefficient 2 – visits to pharmacy, and
- coefficient 3 – common services.

Other municipalities were assigned to selected centres according to the prevailing attraction trend – when a total relative significance of the strongest centre did not reach more than two- thirds of a total relative significance value of the first strongest centre. The other municipalities that failed to demonstrate a sufficient attraction to a specific centre were considered oscillating municipalities.

A household questionnaire survey, or rather a survey conducted at the place of the respondents' residences, was conducted at the same time (2011). Inhabitants of municipalities in the Brno agglomeration represented the base file of the survey; municipalities from the Brno-Province district were selected from this base survey to provide for a comparison with the survey conducted by means of the municipalities' representatives. The sample consisted of 5,500 respondents, aged 15 years and over and permanently living in the specific municipalities. The selection of respondents followed a double stage quota selection process. First, the number of respondents was selected for individual municipalities proportionally to the total population of these municipalities (the number of respondents fluctuated between 10 and 100 according to the municipality size), and then the respondents were selected according to basic demographic indicators (gender,

age), proportionally to the average population of the South Moravia Region. The interviewers were trained graduates and post-graduate students from Masaryk University (for partial results see Kunc et al., 2012a, b, c).

An interesting comparison between the current results of the survey of the inhabitants of the municipalities and the survey conducted via representatives of these municipalities, could be conducted for both daily needs shopping (foodstuffs, drugstore goods) and for common textiles and footwear, industrial goods, books and CDs and furniture shopping, as well as for many common and special services. In the second case we compared travels for selected goods and services to the above-specified centres (responses of the municipality representatives) with travels to shopping centres in the Brno suburbs (responses of the municipality inhabitants).

4. Survey results

4.1 Attraction to non-daily shopping: comparison of the basic service region of Brno between 1979 and 2011

Comparing the current territorial size of the Brno hinterlands (2012) at the level of the basic service region (Brno-Province district in contemporary boundaries) with the situation in 1979 (Figs. 2 and 3), we can see a declining influence of Brno in favour of some surrounding centres in the Brno-Province district. A growing influence of Brno was observed in the hinterlands of nearby district capitals Blansko, Vyškov and Hodonín (see also Szczyrba et al., 2005; Mašíček, 2007; Maryáš, 2010; Vepřek, 2012) and in the growing number of oscillating municipalities that listed Brno, besides their own centres, as an equal destination of the service attraction gradient (Tab. 2 and Figs. 2 and 3). Traditional centres in the Brno hinterlands (Ivančice, Pohořelice, Rosice, Tišnov and Židlochovice, with populations from 5 to 10 thousand inhabitants) have mostly preserved their service areas, even though centres in areas with good transport connections to Brno lost parts of their hinterlands. This particularly applies to centres beyond the Brno-Province district: Velká Bíteš in the west and Hustopeče in the southeast of the region. Nevertheless, strengthening of the town service facilities (see Szczyrba et al., 2005) resulted in the expansion of the service regions of some of these

Center	Number of municipalities in the hinterlands (1979)	Number of municipalities in the hinterlands (2011)	Number of oscillating municipalities (1979)	Number of oscillating municipalities (2011)
Brno	72	55	17	22
Tišnov	53	50	1	6
Rosice	11	13	5	8
Pohořelice	6	11	5	4
Ivančice	6	8	7	5
Židlochovice	5	5	4	5
Kuřim	0	2	0	5
Modřice	0	2	0	4
Velká Bíteš	*8*	*0*	*2*	*4*
Moravský Krumlov	*1*	*0*	*3*	*0*
Mikulov	*0*	*0*	*0*	*1*

Tab. 2: The basic Brno service region: comparison between 1979 and 2011. Sources: Maryáš, 1988; authors' survey
Note: Centres in italics are situated beyond the Brno-Province district

centres, especially Pohořelice and Ivančice. The expansion of the hinterlands of the above-mentioned traditional centres in the Brno surroundings could be attributed to the establishment of new large-scale retailing concepts offering both foodstuffs and non-foodstuffs, assortments of goods (especially discount stores Penny Market and Lidl, and supermarkets Billa and Albert), the presence of which eliminates the need for some inhabitants to travel for some non-daily needs shopping all the way to Brno.

On the other hand, one can observe a development of city service functions in the suburban zone, frequently supported by the location of large-scale retailing units of all types, shopping centres and retail parks, resulting in the development of previously unknown service centres. This observation corresponds with the general theories

about the growth of reciprocal contacts between centres and hinterlands in the post-industrial stage of development (see, e.g. Reynolds, 1992; Marjanen, 1995; Hampl, 2005). Kuřim (the nearest northern hinterland of Brno), Modřice (the nearest southern hinterland), and possibly in future also Šlapanice (east of Brno), are among these incipient centres in the nearest suburban zone of Brno (Fig. 3). We also compared the number of main destinations (Tab. 3) for different product/service categories.

The hierarchy of individual processes related to services changed due to the massive growth of retailing and provision of services after 1989. While special services were typical for a city service centre, i.e. at a micro-regional level, at the end of the 1970s (see Maryáš, 1988), these services have come closer to customers currently and belong to a group of

Special goods purchases	1979	2011
Daily shopping	184	114
Common services	43	35
Visits to pharmacy	18	23
Purchases of common textiles and footwear	34	18
Purchases of common industrial goods	43	17
Special services	12	18
Purchases of books and records	12	11
Purchases of furniture	12	11
Purchases of special goods	5	10

Tab. 3: The number of main destinations in the individual service processes in the Brno-Province district
Sources: Maryáš (1992a,b); authors' survey with municipality representatives, 2011
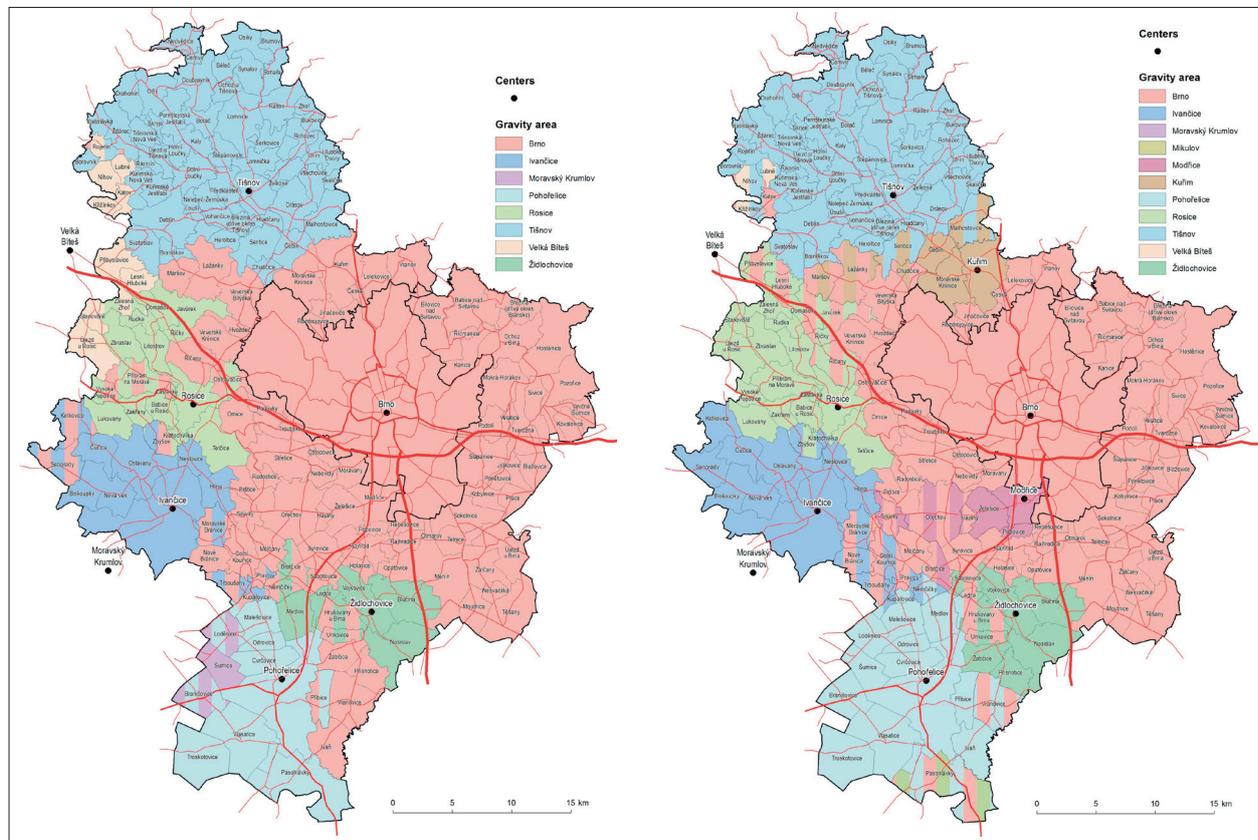
Figs. 2 and 3: Comparison of catchment areas for non-daily shopping and services in the Brno hinterlands between 1979 (left) and 2011 (right)
Source: authors' survey

processes located between the supra-local and micro-regional hierarchical level. Similar changes could be observed also in the medicine shopping position (Tab. 3). The growth in motor-vehicle use in the last twenty years caused a change in the hierarchical level of the vehicle-related shopping process (included in the special goods shopping category in our questionnaire), which used to be considered a service process of higher than micro-regional level in the past century.

The most remarkable changes were caused by the concentration trends in retailing and by the new phenomenon of hypermarkets and shopping centres located mostly at the edge of Brno. The construction of these units in the peripheral locations of cities initiated the process of decentralization of retailing functions within the hierarchy of retailing facilities of these cities. Retailing in city centres began to lose its traditional and key positions in favour of new retailing centres growing in the periphery. The process of commercial suburbanization started in the post-socialist urban environment (Szczyrba, 2002; Šveda and Križan, 2012).

4.2 Attraction gradients for daily shopping: comparison for the basic service region of Brno between 1979 and 2011

In the following Figures 4–6, one can compare the daily needs shopping attraction for the inhabitants of the Brno-Province district, which is primarily focused on basic foodstuffs and small drugstore goods. Figs 4 and 5 are based on the same methodology - answers from the representatives of municipalities, while Fig. 6 is based on the responses of local inhabitants. It is clear that there is a transition from the centrally-controlled retailing model of the socialist period (1979) towards the market environment that has

been gradually established in the Czech Republic since 1990. Cooperative retailing units (Jednota) were typical of socialist rural areas from the 1950s (Szczyrba, 2005; Kunc et al., 2013). Due to socio-political reasons, it was important for planners of the then-communal facilities to provide at least a small retail shop in each municipality or a local part of a municipality, despite the fact that the population in some of these municipalities was less than 100 permanent inhabitants. So-called mobile retail shops were an alternative for the smallest settlements at the end of the 1970s. In our assessment, we do not consider these mobile shops to be comparable with the other retailing units, and this is why the mobile shops listed by the municipality representatives as main destinations of daily shopping were not taken into account (this was the case for two municipalities). The mobile shops and later also other retail facilities in small settlements in peripheral areas, especially northwest of Brno, ceased to exist after 1989.

Comparing the survey results from 2011 in Figures 5 and 6, one can clearly see the similarity between the responses of the municipality representatives and those of the inhabitants, despite the fact that especially in the first case these are opinions of local experts expressing their views on behalf of the whole municipality. This opinion could be somewhat subjective; our research did not reveal any significant discrepancies, however.

Inhabitants from only a few municipalities located close to central Brno, do their daily shopping directly in Brno; this is both because the smooth operation of the public transport system and the fact that the people work in Brno (Kunc et al., 2012c). The shopping for daily needs outside the municipality is necessary for inhabitants in
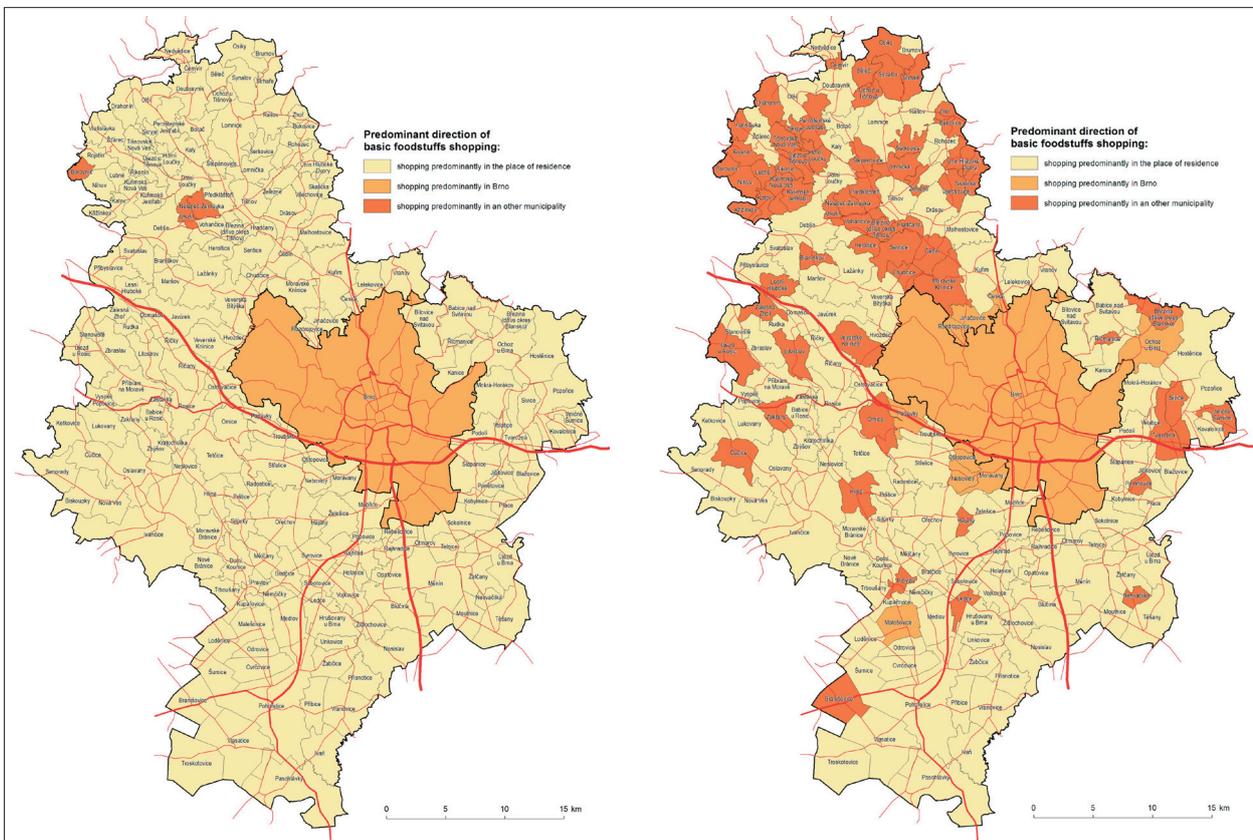
Figs 4 and 5: Places of daily shopping in the Brno hinterland in 1979 (left) and 2011 (right) according to the responses of municipality representatives
Sources: Maryáš, 1988; authors' survey with the municipality representatives, 2011
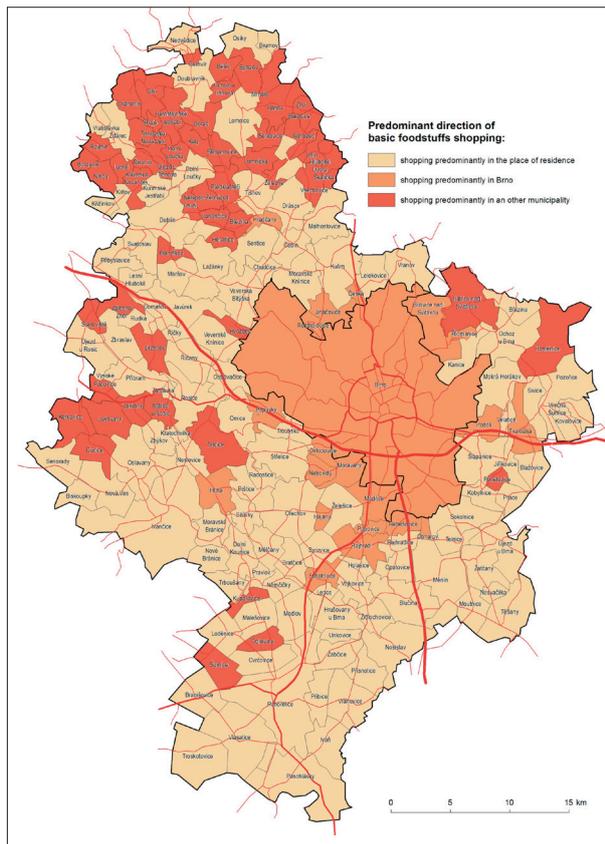
Fig. 6: Places of daily shopping in the Brno hinterland in 2011, according to the responses of municipality inhabitants. Source: authors' survey with the municipality inhabitants, 2011

municipalities with smaller populations and insufficient retailing infrastructure in the north-west hinterland of Brno (Tab. 4). The situation is rather different from the retailing network of the late 1970s, because the market environment has resulted in the disappearance of many unprofitable retailing units. On the other hand, the southern part of the Brno-Province district features a very different settlement structure with large municipalities, whose inhabitants take advantage of the possibility to do their basic shopping in local facilities.

5. Conclusions

A comparison between the current survey and results acquired at the end of the 1970s makes it possible to formulate certain conclusions and generalizations. Although we introduce results of the retail and services gravity survey

for the hinterlands of a single regional centre only, we believe that similar trends can be observed in the majority of other regional centres, both in the Czech Republic and in Slovakia. The transformation of retailing and changes in shopping behaviours proceeded similarly in both countries (possibly with an offset of 2–3 years in Slovakia), and affected all regions to a greater or smaller intensity: see Szczyrba, 2005; Spilková, 2012a and Kunc et al., 2013, for the Czech environment; and Mitríková (2008); Križan (2009) and Trembošová (2010), for the Slovak environment.

As compared with the situation 30–35 years ago, the following development trends can be observed, confirming our defined hypotheses at the outset:

- the relative growth in the importance of regional metropolises – resulting in the expansion of the regional extent of the Brno service hinterlands, especially beyond the Brno-Province district, at the expense of nearby district town hinterlands (see also Mašíček, 2007; Maryáš, 2010; Vepřek, 2012) and growth in the number of oscillating municipalities;

- an expansion of the service hinterland in the case of non-daily travels for shopping and services in some traditional centres located close to Brno, especially through the strengthening of their service facilities (for similar conclusions, see Szczyrba, 2005) with the prevalence of large-scale discount concepts such as Penny Market and Lidl and supermarkets such as Albert and Billa;

- the large growth in services resulting in the changing hierarchy of some service processes – travels for special services and travels for shopping medicines;

- growth in motor-vehicle use resulting in a decline of the hierarchical level of shopping processes related to motor vehicles (shopping for special goods);

- growth in reciprocal contacts between the regional centre and the nearest suburban hinterland (for similar conclusions see also Marjanen, 1995; Hampl, 2005) resulting in the establishment of new, previously absent local service centres supported by the presence of large-scale retailing concepts and shopping centres (Kunc et al., 2013); and

- a significant decline in the service functions of typical rural settlements – daily needs shopping (foodstuffs and small drugstore goods) is virtually impossible in settlements with less than 200 inhabitants.

The changes in the gravity of retail and services and the related changes in the shopping behaviours of inhabitants, cannot be evaluated simply as „positive" or „negative" within the time period for which data are available. The

Municipality number of inhabitants	Shopping at home (number of municipalities)	Shopping predominantly in an other municipality (number of municipalities)	Shopping predominantly in Brno (number of municipalities)	Share of „shopping in an other municipality" (%)
0-99	0	11	0	100.0
200-199	1	18	0	94.7
200-499	26	18	0	40.9
500-999	36	12	5	22.6
1000 and more	52	5	4	8.2

Tab. 4: Daily needs shopping according to the shopping destination and municipality size in 2011
Source: authors' survey with the municipality inhabitants 2011

transformation from a planned to a market economy has been beyond any evaluative criteria at hand, and some of its aspects cannot be objectively evaluated even today. On the one hand, the traditional local service centres have preserved and even expanded their hinterlands as to non-daily travels for retailing and services, and newly-emerging smaller suburban centres (super- and hyper-markets, discount stores and shopping centres) have been established. On the other hand, shopping for daily needs goods is practically impossible today in small settlements with less than 200 inhabitants. The situation is not critical yet (specific problems have to be faced namely with respect to retired people and women on maternal leave, see also Kunc et al., 2013c). It has been partially alleviated by a significant growth in motor vehicle use, which makes it possible to close down some service processes at ever-increasing distances.

Nevertheless, rural areas definitely lose their position in the service processes, as reported in studies from both the Czech Republic (Binek et al., 2007; Vaishar et al., 2011) and from other countries (Moseley et al., 2004; Cebollada, 2009; Głaz and Hasiński, 2011; Nørgaard, 2011). This situation is not only about changes in the service processes and shopping behaviours, but also about the future critical issue of the existence of virtually any services available in rural areas – services which are irreplaceable for the stability and social status of rural areas (Farrington and Farrington, 2005; Karlsson, 2012).

Acknowledgment

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INFLUENCES OF ENVIRONMENTAL DRIVERS
ON LAND COVER STRUCTURE AND ITS LONG-TERM CHANGES:
A CASE STUDY OF THE VILLAGES
OF MALACHOV AND PODKONICE IN SLOVAKIA

Michal DRUGA, Vladimír FALŤAN

Abstract

The influence of environmental drivers on long-term land cover changes in two mountainous villages in Central Slovakia is assessed in this paper using generalized linear models (GLM). Historical cadastral maps and aerial photographs were analyzed to describe the land cover change over five time horizons ranging from 1860 to the present, using the CORINE Land Cover classification. The hypothesis that higher slope, elevation and distance to settlement strongly influence lower intensities of land use was mostly confirmed, but geology was also identified as an important factor. The category of 'forests' was the most accounted for land cover class, while arable land and grassland were only considerably affected by the drivers in some periods. On the other hand, shrubs were almost completely unrelated to the investigated drivers. The areas of land cover change were not so well explained by the GLMs.

Shrnutí

Vliv environmentálních podmínek na strukturu krajinného pokryvu a její dlouhodobé změny: případová studie obcí Malachov a Podkonice na Slovensku

Předkládaná studie hodnotí vliv environmentálních podmínek na dlouhodobé změny krajinného pokryvu ve dvou horských obcích na středním Slovensku, a to s využitím krabicových grafů, jednoduché logistické regrese a generalizovaných lineárních modelů (GLM). S využitím klasifikace CORINE Land Cover je analyzován krajinný pokryv na historických katastrálních mapách a leteckých snímcích v pěti historických horizontech od r. 1860 do současnosti. Hypotéza, že větší sklon, nadmořská výška a vzdálenost k sídlům je příčinou menší intenzity využívání krajiny byla do značné míry potvrzena, avšak k významným faktorům patřilo i geologické podloží. Modely nejlépe vysvětlitelnou třídou krajinného pokryvu byly lesy; lokalizace orné půdy a travních porostů byla v některých zkoumaných obdobích rovněž značně ovlivněna zkoumanými podmínkami, zatímco lesokřoviny na nich byly prakticky nezávislé. Velikosti ploch změn krajinného pokryvu byli pomocí GLM relativně méně vysvětlitelné.

Keywords: land cover change, farmland abandonment, environmental conditions, driving forces, generalized linear models, CORINE, Malachov, Podkonice, Slovakia

1. Introduction

The structure of a cultural landscape is largely determined by human decisions – by direct or indirect impacts of human activities, or by choice of land abandonment. This decision-making process is not chaotic, but rather, judiciously based on many factors – the "drivers" of land cover change. Changes in landscape structure significantly affect its ecological stability (Lipský, 2001), as well as its biological (Löfvenhaft et al., 2004), environmental and aesthetic values (Nassauer, 1995). The investigation of driving forces has therefore developed into an important research topic recently.

Studies of land cover drivers use miscellaneous methodologies, as there are different ways of understanding and studying them at different spatial scales and in temporal periods. It is suitable to determine the motivation of all relevant stakeholders, either through oral history interviews or studying relevant historical documents (e.g. Bürgi et al., 2004; Mottet et al., 2006; Domon, Bouchard, 2007; Schneeberger et al., 2007; Calvo-Iglesias et al., 2009). The disadvantage of this approach is the weaker availability of information for larger areas and longer time periods, as well as the fact that the obtained information can often be non-spatial. Therefore it is difficult to quantify their impact on land cover changes, which are spatial in their nature.

Hence, many studies apply spatially explicit characteristics of environmental and socio-economic conditions as drivers. These drivers affect land-use decision making indirectly, or they explain the background to the decision making. Although this approach does not directly explain reasons for the changes, it profits from: better spatial and temporal availability of the drivers data (Hietel et al., 2004); their better comparability between different areas; and more exact statistical methods, which are then possible. One of the main motivations for research on the driving forces of landscape change is to find general patterns, valid beyond the specific situation under study (Bürgi et al., 2004).

Spatial drivers have been widely used in recent research studies. Wear and Bolstad (1998) highlighted elevation, slope and distance to roads as important factors in land use change, and their importance was also confirmed in deforestation models by Schneider and Pontius (2001).

Many more environmental drivers were used by Rutherford and Bebi (2007, 2008) to assess the land cover change drivers in Switzerland; and also by Tasser (2007) in a local study of natural reforestation on alpine pastures. Hietel (2004) recommended the use of socio-economic variables to increase the land cover change variance accounted for, rather than using the environmental drivers alone. Yet, later he stated that socio-economic drivers themselves cannot explain land cover changes, but combined with the environmental drivers they can facilate the reconstruction of the changes (Hietel et al., 2005).

On the other hand, both environmental and socio-economic drivers were significantly associated with land use changes in a study of marginal agricultural landscapes in Portugal (Van Doorn, Bakker, 2007). Gellrich et al. (2007) also succesfully applied both types of spatial drivers to confirm the hypothesis that forest regrowth takes place where cultivation costs are high and yield potential low. Most socio-economic spatial drivers are only available at the municipality level, however. Because many land cover changes are detected only at more detailed scales, the focus here is on the drivers which are spatially distinguishable at these scales.

Topography seems to be the most common environmental driver utilized in land cover change studies. Elevation is applied as a proxy for temperature gradient (Rutherford, Bebi, 2008), to distinguish flood areas (Schneider and Pontius, 2001), but also to determine the vertical zonality of soils (Florinsky, Kuryakova, 1996). Slope is a typical driver utilized to represent cultivation costs in the area (Gellrich et al., 2007). Higher values of slope angle were shown to be correlated with higher land abandonment and reforestation in Indiana (Harrison et al., 2008), the German Highlands (Hietel et al., 2004), the Alps (Tasser et al., 2007), the Pyrenees (Mottet et al., 2006), and many other areas.

Its influence, however, does not necessarily need to be linear (Gellrich et al., 2007; Schneider, Pontius, 2001). Similar effects of slope were reported also in the postsocialist development of land use in Albania (Müller, Munroe, 2008) and the Czech republic (Havlíček, Chrudina, 2013). On the other hand, farmland abandonment was lower in areas with higher slope and elevation in Western Ukraine in the same period, highlighting the fact that socio-economic reasons for abandonment differ also among postsocialist countries (Baumann et al., 2011).

The importance of the influence of slope aspect on land cover was secondary, according to Hietel et al. (2004), but a study of permanent meadows loss in the Alps showed that its effect is significant (Monteiro et al., 2011). Because aspect represents site conditions only indirectly, insolation or solar radiation are preferred in some recent studies (Martínez, 2011; Rutherford, Bebi, 2008; Serra et al., 2008).

The accessibility of areas is one of the most important attributes determining land cover, which has been paid attention since the first land use model (von Thunen, 1826). Many studies have confirmed its strong effect on land cover structure and its changes, such as farmland abandonment (Mottet et al., 2006; Müller and Munroe 2008; Müller et al., 2009; Prishchepov et al., 2013; Wu and Zhang, 2012). Löw stated that the maximum commuting distance from village to fields, established in Czech lands from the 13th century until the introduction of mechanization, was 1.2 km (Löw, Míchal, 2003). Gellrich (2007) described a non-linear relationship of forest re-growth and the distance from roads

in Switzerland, where re-growth decreases at very large distances due to the fact that remoteness has only minor effects on alpine pastures.

The effects of the spatial drivers slightly differ in the various regions of Europe, reflecting different levels of socio-economic development. Since Slovakia is historically situated in the cultural and political influence of Western and Eastern Europe, research in this country is promising.

Significant socio-economic changes have influenced development in the region of the former Austro-Hungarian Monarchy during last 150 years. These changes are well described by Bičík et al. (Bičík et al., 2001): the freeing of a large labour force after the abolition of serfdom in 1848 led to extensive economic development and use of resources. Expansion of agricultural lands was not possible after the 1880s, therefore technological changes led to industrialization and agricultural intensification in fertile lowland areas. Later, the intensity of land use was positively influenced by an extensive land reform and partial breaking apart of the large estates after the establishment of the Czechoslovak Republic in 1918, but negatively affected by the increasing competition of cheaper imported grain, both World Wars and economic crises. After WWII, continuing general economic tendencies and farm collectivization led to a serious agricultural extensification in less fertile regions and further intensification in lowlands, but large areas of agricultural land were confiscated for non-agricultural activities. The most important processes after the 'Velvet Revolution' in 1989 were: (i) the reintroduction of a market economy; (ii) the restitution of private property and partial privatization of state property; (iii) the transformation of agricultural co-operatives into agricultural stock companies, or co-operatives where the legal rights of landowners are respected; and (iv) an increasing environmental awareness among the population.

Even so, only scant attention has been paid to the spatial drivers of land cover change in Slovakia. Land cover changes themselves are relatively well described at the national level (e.g. Feranec, Nováček, 2009) and some regional and local studies specified these changes at a more detailed scale (Cebecauerová and Cebecauer, 2008; Kopecká, 2006; Oláh et al. 2006; Boltižiar et al., 2008; Ivanová et al., 2012). Spatial correlation between topographic factors and land cover was assessed by Šúri (2003) and Kandrík, Oláh (2010). Senko modelled land cover and vegetation change using insolation, precipitation and soil temperature drivers (Senko et al., 2008), and Falťan presented studies on the windthrow impact on vegetation on various "geotope" sites in the High Tatra foothills (Falťan, Pazúrová, 2010; Falťan et al., 2011). Oláh (2003) interpreted land use change in the Podpoľanie region, by land-use form affinity to landscape-ecological complex components. The study by Lieskovský et al. (2013), analysing the driving forces of vineyard abandonment, appears to be the only work explicitly focusing on spatial land cover change drivers in Slovakia.

Following on from the above-mentioned works, this study attempts to describe the influence of spatially explicit environmental drivers on land cover structure and its changes in mountainous rural regions in Slovakia. Because the influence of drivers may change over time (Aspinall, 2004), we tried to use historical sources depicting land cover, (1) with suffcent cartographic precision and (2) for a long period of time. For these purposes,

aerial imaging since 1949 and historical cadastral maps from 1860 have proven beneficial. We focused on the research of small areas at a detailed scale, because many important land cover change processes and driver influences are only detectable at these scales. Therefore, the areas surrounding the villages of Malachov and Podkonice in central Slovakia were chosen for analysis (Fig. 1). Various statistical methods have been used worldwide to quantify the effects of drivers. Because logistic regression is one of the methods most often utilized to describe the influence of land cover change drivers (Rutherford, 2007), and generalized linear models have proven to be a useful tool for land cover change modelling (Millington et al., 2007), these methods were applied in our study.

We focused on following research questions:

1. which land cover changes occurred during the research period?;

2. which environmental drivers mostly influenced the land cover and its changes?; and

3. which land cover classes and which changes were mostly influenced by the synergic effect of environmental drivers?

Acording to the literature review above, we formulated the following partial hypotheses:

- higher slope, elevation and distance to settlement are related to the classes with lower intensities of use, and therefore they have:

  1. a negative influence on the localization of built-up areas, arable land, and processes of agricultural intensification and urbanization; and

2. a positive indirect influence on the localization of forests, shrubs, and processes of agricultural extensification; and

- higher solar radiation should positively influence the suitability for agricultural cultivation.

2. Material and methods

Spatial land cover data, serving as dependent or response variables for the regression models, were obtained from different sources. While cadastral maps for Malachov in 1860 and Podkonice in 1866 provided data for the 19th century, aerial photo-grammetric images from 1949, 1968 (1961 for Podkonice) and 1986 depicted 20th century changes. Current land cover was described using orthophotomaps from 2006, revised by detailed field research in the summer of 2011.

Historical cadastral maps and aerial images were geo-rectified to identify land cover class polygons. We used the 4th level CORINE Land Cover method for this classification (Feranec, Oťahel, 1999), with minor changes to reflect the detailed scale of 1:10 000 in this study. The minimal mapping unit was set at 0.25 ha and some classes were defined more specifically (Tab. 1). In addition, land cover classes were aggregated in six generalized classes for most analyses (Tab. 1).

Descriptive statistics outlined changes in land cover in the observed period and determined the most significant processes. Each land cover class from each available year was converted to a separate binary layer for regression modelling (i.e., its presence or absence). Finally, land cover
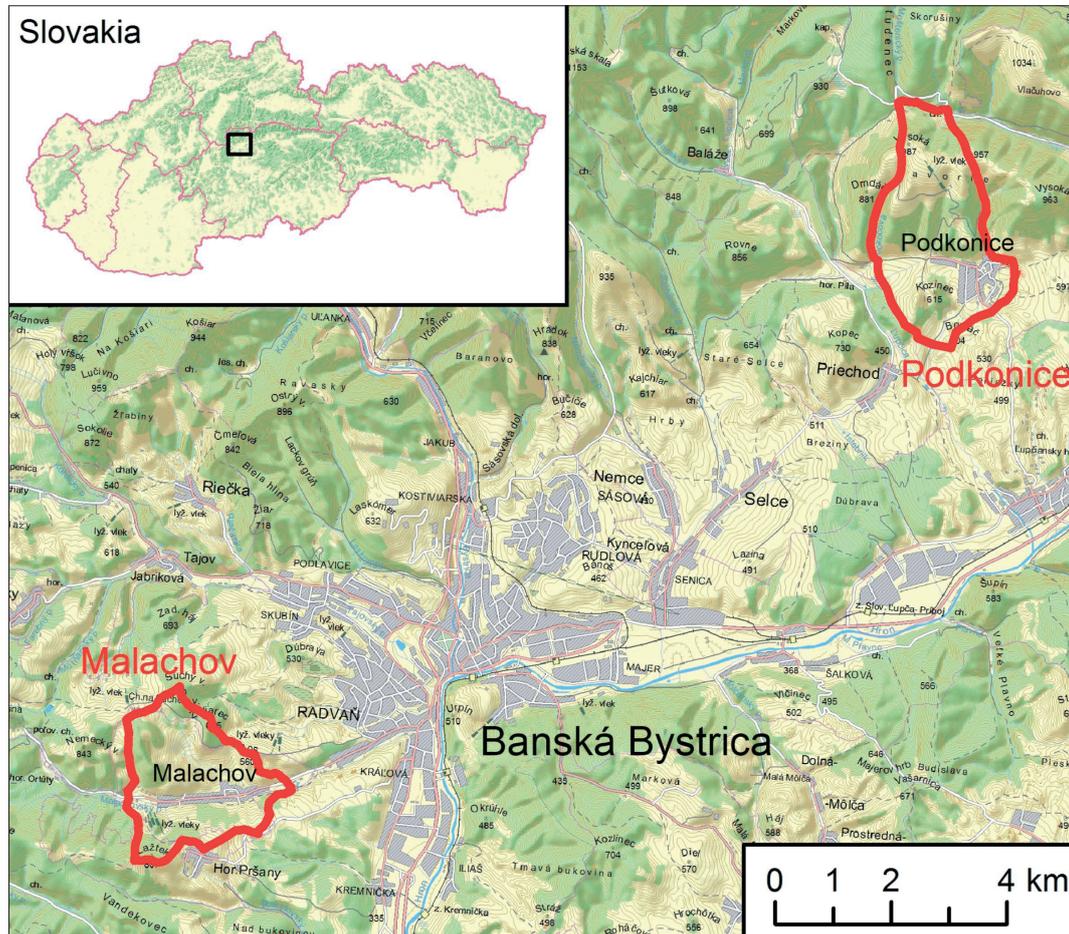

Fig. 1: The geographical situation of the study areas

CLC 4 code	CLC 4 name of the class	Description of the class	Generalized land cover class
1.1.2.2	Discontinuous built-up areas with family houses	build-up areas in villages, including buildings and courts, without adjacent gardens, fields or lawns	artificial surfaces (1)
1.2.1.1	Industrial and commercial units	mostly areas of cooperative agricultural farms	artificial surfaces (1)
1.2.2.1	Road network and associated land	visible areas of roads	artificial surfaces (1)
1.3.1.2	Quarries	areas of quarries	artificial surfaces (1)
1.3.3.1	Construction sites	areas under construction development	artificial surfaces (1)
1.4.1.2	Cementeries	areas of cementeries	artificial surfaces (1)
1.4.2.1	Sport facilities	areas of playgrounds with associated buildings	artificial surfaces (1)
1.4.2.2	Leisure areas	areas of recreational cottages	artificial surfaces (1)
2.1.1.1	Arable land	areas of arable land	arable land (2)
2.2.2.1	Orchards	areas of fruit orchards	permanent crops (2.2)
2.3.1.1	Grassland prevailingly without trees and shrubs	areas of grassland prevailingly without trees and shrubs (less than 15%)	grassland (2.3)
2.3.1.2	Grassland with trees and shrubs	areas of grassland with trees and shrubs (15-40%)	grassland (2.3)
2.4.2.1	Complex cultivation patterns without scattered houses	small patches of fruit orchards, annual and permanent crops, belonging to village houses	permanent crops (2.2)
2.4.2.2	Complex cultivation patterns with scattered houses	small patches of fruit orchards, annual and permanent crops with scattered cottages	permanent crops (2.2)
3.1.1	Broad-leaved forests	areas of broad-leaved forests	forests (3.1)
3.1.2	Coniferous forests	areas of coniferous forests	forests (3.1)
3.1.3	Mixed forests	areas of mixed forests	forests (3.1)
3.2.4.1	Transitional woodland-scrub: Young stands after cutting	areas of young stands planted by man after cutting, or glades	shrubs (3.2.4)
3.2.4.2	Transitional woodland-scrub: Natural young stands	areas of natural forest regeneration/recolonization	shrubs (3.2.4)
3.2.4.3	Transitional woodland-scrub: Bushy woodlands	areas formed by shrubs (Juniperus, Crataegus, Rosa, etc.) along with grassland and dispersed trees, which do not form continuous canopy	shrubs (3.2.4)

Tab. 1: Definition of the land cover classes, used for the classification and for further analysis

change areas were aggregated into three major land cover flows (Feranec et al., 2010):

1. agricultural extensification: including transitions from arable land, or gardens and orchards, to grassland, to grassland with scattered trees and shrubs, to shrubs, or to forest;

2. agricultural intensification: including the opposite transitions to those in extensification; and

3. urbanisation: including transitions to artificial surfaces.

Predictor variable	Unit
Elevation	m
Slope	°
Sine of aspect	– 1 to 1
Radiation	kJ/day
Topographic wetness index	index
Distance to settlement	m
Geological substrate	multinominal

Tab. 2: Environmental drivers used as predictor variables in regression models

The spatial extents of these processes were also used as response variables in the regression models for each period between subsequent years, and for 1949–2011 to assess total change in the most turbulent period. Besides the assessment of the land cover change, recognition of areas without change during the observed period is of utmost importance, and these are assessed in the models as "stable areas".

Maps of the relevant spatial and biophysical drivers with raster layers of 2 m resolution were used as independent (predictor) variables for regression modelling. According to the studies mentioned in the Introduction, the following seven spatial drivers were used in this study: elevation, slope, aspect, insolation, distance to settlement, topographic wetness index (TWI) and geological substrate (Tab. 2).

The raster for direct distance to the settlement was created by the ArcGIS distance module, and geological substrate information was obtained by vectorizing quaternary geological maps scaled at 1:50 000 and held at Štátny geologický ústav Dionýza Štúra (2011). The remaining drivers were derived from DEM, computed in the GRASS GIS RST module (spline: 0.1; tension: 40). The contours of a topographic map at 1:10 000 scale were utilized as DEM interpolation input. The terrain aspect was substituted by its sine function, thus defining its southerly aspect (Rutherford, 2008), and insolation was computed

in the ArcGIS solar radiation module as the average of insolation for each half hour during each 14th day in the year (difuse model: standard overcast sky; diffuse proportion: 0.3; transmittivity: 0.5). Finally, the topographic wetness index was calculated in GRASS GIS using the equation:

$$TWI = ln \frac{contributing\ catchment\ [m^2]}{\tan slope\ [°]}$$

The entire study area was then divided into 10×10 m grid cells as basic statistical units for analysis, with assigned average values for dependent and independent variables.

Regression analysis consisted of several procedures. First, we calculated regressions for each environmental driver against each land cover area or change. We then tested the multi-collinearity of the drivers using a correlation matrix. Because the use of correlated predictor variables violates the assumption of their independence, only one variable from the group of highly correlated variables was used in the multivariate model (Millington et al., 2007). The correlation limit R > |0.8| was used for this purpose (see Tab. 3), as seen in similar works by Gellrich et al. (2007), Martínez (2011) and Rutherford (2008), and referenced to Menard's (2002) recommendation.

We used generalized linear models (GLMs) for analysing the synergic influence of chosen environmental drivers on land cover classes in different years, and for their changes, as recommended by Millington et al. (2007). An individual regression model was calibrated for each response variable using the same set of predictor variables. Linear combinations were used as predictors to incorporate the synergic effects of drivers, and polynomial terms up to the 4th degree (Rutherford, 2007) determined possible non-linear relationships. Exceptions here were combinations with geological variables, which deform the regression design, due to the nominal character of the variables. Because the incorporation of some variables and their derivations not only increase, but can also decrease the model's predictive power, we used automated stepwise backward regression to omit these types of variables.

3. Results

3.1 Land cover change

The land cover of the study area was identified in five temporal horizons. The development of land cover class areas and land cover spatial distributions in two characteristic years is presented in Figure 2.

The cadastral maps of 1860/68 depict a land cover with distinct boundaries between zones of different intensity of use. Villages with built-up areas and gardens were surrounded by a landscape matrix of arable land, while pastures and meadows occupied less suitable areas. The more distant areas

were dominated by meadows, which prevailed over pastures, while forests covered the most unsuitable areas.

Before 1949, there was a significant decrease in arable land, mainly in the steeper and most distant areas, with grassland areas also diminished in favour of forests and shrubs. Cooperative farms were then established between 1961 and 1968, and subsequent collectivization led to a remarkable loss of arable land. In addition, the construction of farm facility buildings reinforced the general increase in artificial surfaces, which was hastened by the spread of family houses. Permanent crop areas increased, especially through orchard establishment in Malachov (Fig. 3 – see cover p. 2). Meanwhile, forests expanded significantly, and grassland and shrub areas grew closer to the settlements. The most significant overall changes were noted in decreased arable land and forest expansion, and these changes continued until 1986.

The land cover in 2011 depicted the changed socio-economic conditions following the transition to a market economy. The most important change was in grassland overgrowth (Fig. 4 – cover p. 2). Here the decrease in bare grassland without scattered trees and shrubs was particularly rapid, almost equalling the rate of decrease in arable land following collectivization, making cultivated meadows a threatened land cover class. Areas affected by forest cutting spread quickly and, combined with the overgrown meadows (Fig. 5 – see cover p. 4), they caused an expansion of shrubs.

3.2 Influence of environmental drivers

The spatial distribution of the drivers is depicted in Figure 6. The multi-collinearity test in Table 3 defines notable correlations between some factors, thus influencing the interpretation of results. The correlation r > |0.8|, which is critical for omitting one of the variables from the multiple regression model, was attained only by radiation and the sine of aspect. When higher interpretation values for radiation were considered, aspect was omitted from the models.

The relationships between land cover and drivers in the chosen years 1949 and 2011 are compared by box-whisker plots in Figure 7, and quantified by simple regression analysis in Figure 8. The most notable relation is the preference for more intensive landuse to concentrate in less steep terrains, thus confirming our hypothesis. This applies in both these years, with the only remarkable change being the arable land shift to the flattest areas in 2011. Regression analysis shows that slope exerted a particularly strong influence on forest areas, with the maximum observed in 1986. There was also an important influence on the distribution of arable land, especially in the pre-collectivization period, together with an increasing effect on grassland.

The boxplot of the land cover relationship to TWI depicts a similar linear trend to slope (Fig. 7). This is partly

	Elevation	Slope	Sin aspect	Radiation	TWI	Distance
Elevation	–	0,3557	0,1100	0,0405	– 0,2786	0,6850
Slope	0,3557	–	0,2423	– 0,2940	– 0,4933	0,3602
Sin aspect	0,1100	0,2423	–	– 0,8598	– 0,2200	0,4033
Radiation	0,0405	– 0,2940	– 0,8598	–	0,0909	– 0,3219
TWI	– 0,2786	– 0,4933	– 0,2200	0,0909	–	– 0,1764
Distance	0,6850	0,3602	0,4033	– 0,3219	– 0,1764	–

Tab. 3: Spatial correlation of selected environmental drivers [r] with highlighted correlation (r > |0.8|)
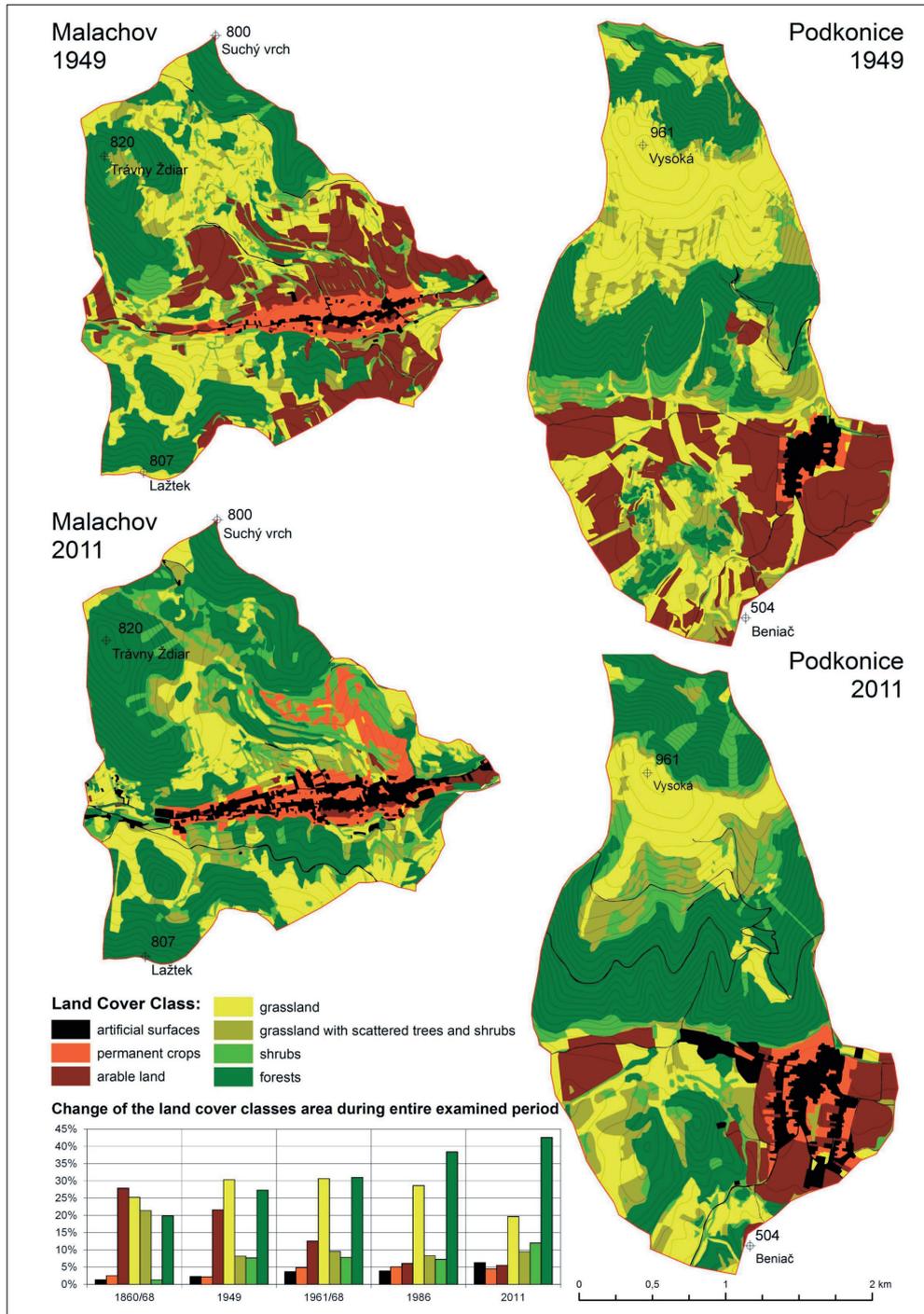
Fig. 2: Land cover of the study areas in the (model) years 1949 and 2011, and the development of area share of land cover classes in all historical horizons

explained by the correlation of both drivers (r = − 0.49, Tab. 3), as only weak R^2 values were obtained for TWI infuence models (Fig. 8). In relationships to elevation and radiation, the expected difference between the intensively and extensively used areas is notable, as those intensively used areas mostly have values over 850 kJ.m^{-2} per day and are situated in areas under 550 m a.s.l. The influence of distance clearly separates the arable land from the more extensive land use classes, which occupied the more distant areas in both 1949 and 2011 (Fig. 7). According to the simple regression analysis (Fig. 8), geology was established as an important driver for each land cover class. Also, elevation and distance had significant influences on arable land and grassland in the pre-collectivization era.

3.3 Explaining land cover classes and land cover changes

The synergic effects of the drivers on land cover were evaluated by GLMs (Fig. 9). Most models had a coefficient of determination between 20% and 40%. Higher values were achieved for forests, with over 53% of the variance explained at the last three time points, and for arable land with 42% to 48% levels of explanation in the pre-collectivization period. On the other hand, the models for shrubs explain only a negligible part of the spatial variability. These results were reflected also in the simple regression assessment of individual drivers in Figure 8. Only forests and arable land achieved notably strong relationships with some of the drivers, while the remaining classes exhibited average or weak relationships, especially in the case of shrubs.
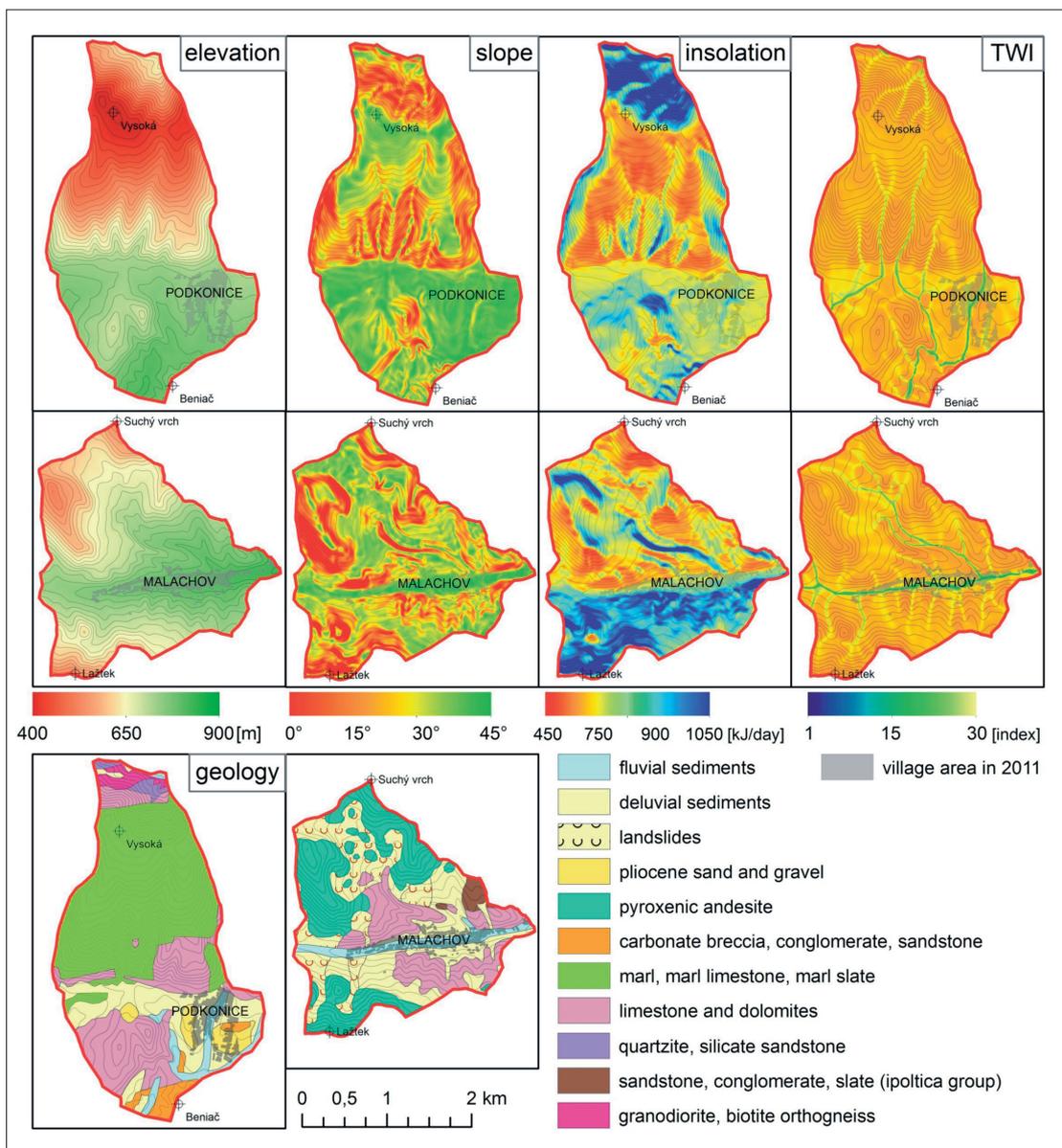
Fig. 6: Spatial distribution of selected environmental drivers in Podkonice and Malachov surroundings
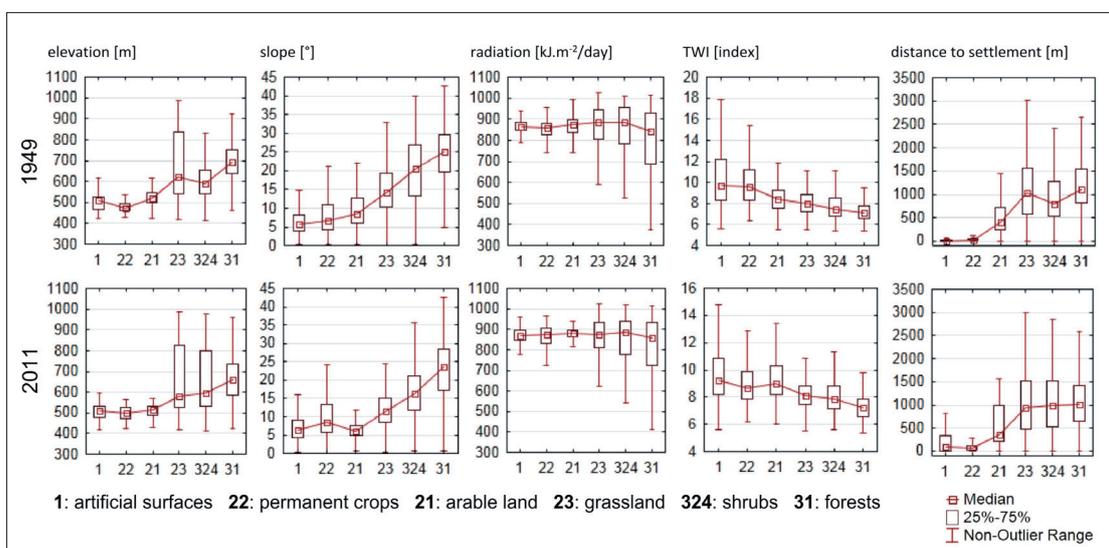

Fig. 7: Distributions of land cover classes on the scale of different predictor variables in the years 1949 and 2011. Note: The land cover classes are sorted according to the intensity of anthropogenic transformation of the natural state (most to least)

Land cover change processes were also assessed by GLMs in subsequent years, as well as for the period 1949–2011 (Fig. 10). The models generally achieved lower R^2 values for changed areas than for the land cover class areas themselves. Relatively higher values were established for total change in the period 1949–2011 than for the shorter periods between subsequent horizons. Agricultural extensification had the highest level of explained variation, followed by urbanization, while agricultural intensification was explained the least.

4. Discussion

4.1 Land cover change

The land cover changes discussed here conform to those in other studies in Slovakia (Kopecká, 2006; Cebecauerová, Cebecauer, 2008; Kanianska et al., 2014), where two changes in agricultural organization are noted: (1) the transformation to cooperative farming, with subsequent land collectivization in socialist period; and (2) the re-introduction of the market economy in the 1990s.

The pre-collectivization loss of arable land and the increase in forests are remarkable. This extensification was most likely caused by the combined effects of technological change, emigration and the decreased importance of farming as a livelihood (compare Bičík et al., 2001; Kandrík and Oláh, 2010). Land use extensification is documented in both areas early on, in the period when intensification took place in lower and more favourable areas (Havlíček, Chrudina, 2013). These changes concur with the results of Kanianska, who described arable land expansion in the lowland areas of Slovakia, a slight increase in the submountainous villages, but with decreases in the mountainous settlement areas (Kanianska et al., 2014). This extensification underlines the repressing effect of environmental drivers in mountain villages, but also the effect of proximity to the town of Banská Bystrica, as an industrialized centre offering employment.
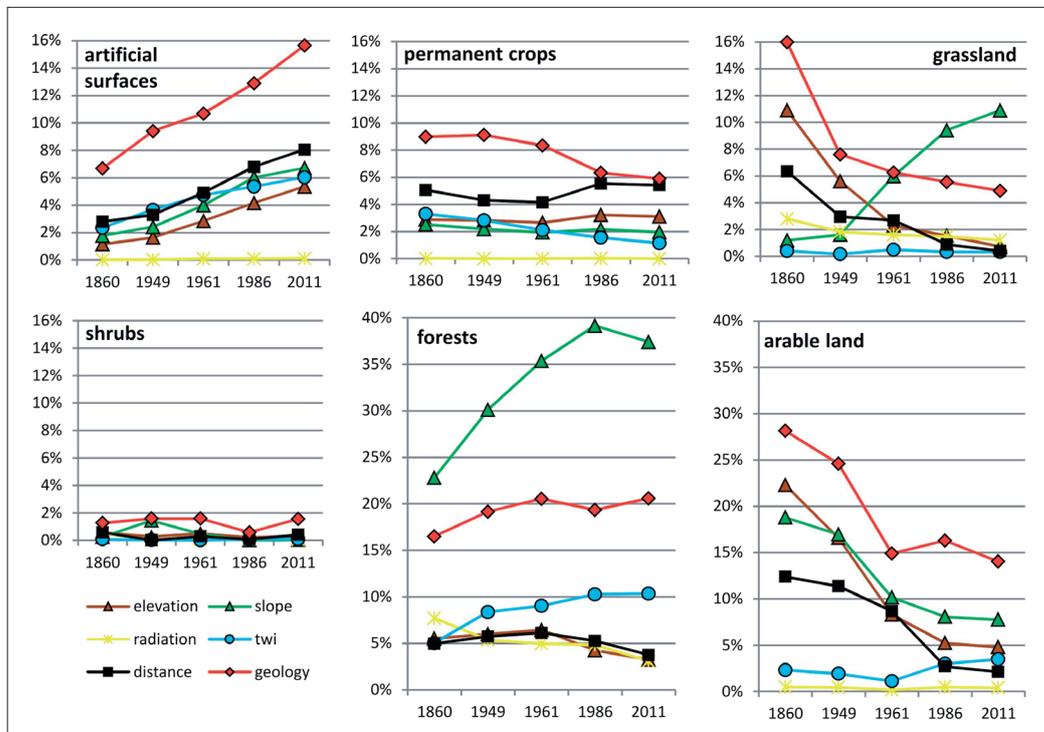
Fig. 8: Influence of partial predictors on the spatial distribution of land cover classes. Simple linear regression was used to calculate r^2
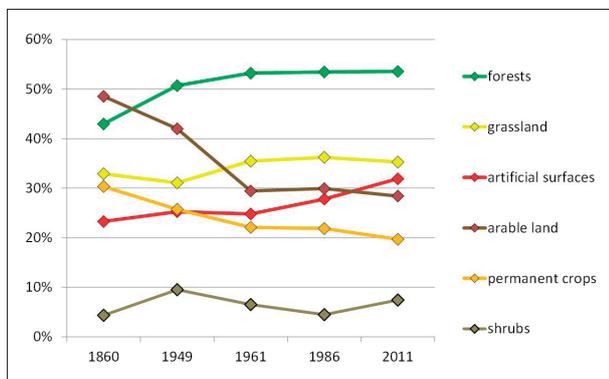
Fig. 9: Coefficients of determination (R^2) of GLMs calibrated for different land cover classes in different years. R^2 shows the dependence of land cover spatial distribution on the synergic effect of the drivers
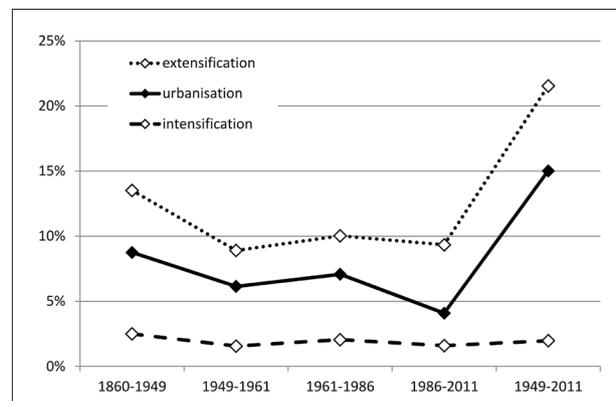
Fig. 10: The influence of the predictors (represented by R^2 of GLMs) on the spatial distribution of areas of land cover changes in different year intervals

In the socialist period, there was a rapid decrease in arable land in favour of grassland, despite the overall trend of a spread of arable land as documented in the period 1970–1990 in Slovakia (Feranec et al., 2007). This concurs with the processes of agricultural extensification in mountainous areas, documented in Slovakia (Oláh, 2003; Kandrík, Oláh, 2010), but also in Western Europe (MacDonald et al., 2000; Strijker, 2005). The general trends to urbanization and industrialization also affected our study areas, but no extensive wood harvesting occured during this era. This is contrasted with the remarkable loss of forest areas at the national level (Feranec, Oťahel, 2008) and with the high dynamics of forest cover in the Carpathian ecoregion (Griffiths et al., 2013; Main-Knorn et al., 2009), and underlines the fact that forest cover changes are highly dependent on forest management cycles.

The most important land cover process in Slovakia following 1989 was an increase in the shrub-transitional woodland class, which was reinforced by both wood harvesting and the overgrowth of grassland (Feranec, Oťahel, 2008). This concurs with the results in Malachov and Podkonice, where the percentage of shrubs (between 7 and 8% after 1949) increased to 12% in 2011. While the forest area also continued to increase, reflecting the national increase, the most notable change involved the retreat of grassland without scattered trees and shrubs, which decreased from 29% to 20%, greatly affecting the actual landscape appearance.

Besides specific developments in some periods, the few enduring trends throughout this study period are:

1. an increase in forest and artificial surfaces;

2. a very large decrease in arable land; and

3. a shift in classes closer to settlements.

Similar results are described for the moutainous areas by Kanianska et al. (2014) in the village of Liptovská Teplička, by Kandrík and Oláh (2010) in the Lower Spiš region, by Bičík et al. (2001) in the Czech Republic, and in greater detail by Demek et al. (2012) in eastern Moravia. It is possible to consider the areas of Malachov and Podkonice (Fig. 11 – see cover p. 4) as representative of this kind of village territory, since the land cover change processes mostly concur with developments in other mountainous village areas in Slovakia and the Czech Republic.

4.2 The influence of environmental drivers

The first hypothesis about the effect of elevation, slope and distance on land cover has been mostly confirmed, as shown by the box-whisker plots (Fig. 7). This influence, though well analyzed in other countries, has been only roughly described in Slovakia by Šúri (2003) and Kandrík, Oláh (2010), and it has not been assessed by advanced statistical methods at a detailed scale. The influence is particularly obvious in the slope plot, where land cover classes with higher anthropogenic modification preferred less steep terrain in both depicted years. Also elevation and distance diversified the spatial distribution of land cover classes significantly. The absolute maximum distance of fields from a settlement was 1.5 km in 1949 (Fig. 7), slightly exceeding the maximal diameter of 1.2 km, stated by Löw and Míchal (2003).

Individual regression analyses specified the influence of the drivers (Fig. 8). The influence is not so dominant for all land cover classes, and it also changes over time (compare Aspinall, 2004). Models relating slope and forests had the highest coefficients of determination, and this confirms the strong relative predisposition of steep areas for forestry. This

influence has increased in recent years, most likely because steep areas were often previously used as pastures in the zone of intensive agriculture and as forests in the extensive zone, while they are all usually reforested now. The relatively strong influence of slope was detected by the models for arable land before collectivization, and for grassland after it. Since transition of many fields into meadows followed the introduction of collectivization, these models most likely partly depict relationships occurring in the same area. This underlines the shift in agricultural demands on the environment, where fields held by private farmers in the past are now suited only to tractor mowing.

According to many studies, elevation and distance are typically strong factors (e.g., Martínez, 2011; Hietel et al., 2004). In this study, these factors are particularly important for the localization of grassland and arable land, especially in the pre-collectivization period. This confirms the previous statement that the zones of intensive and extensive agriculture had distinct boundaries. The influence of elevation and distance is relatively similar for all land cover classes, mainly because of their corresponding high spatial correlation. We assume that this correlation is high for most villages in mountainous regions, as they are situated on the valley floor. Such high correlations are a reason for omitting elevation from the models in some studies (Gellrich et al., 2007; Millington et al., 2007). Therefore it is reasonable to aggregate these variables in one variable which defines area accessibility, although this would ignore the climatological aspects of elevation.

Verification of the second hypothesis about the insolation effect on land cover is disputable. According to the box-plots, there is a weak trend distinguishable, where grassland, shrubs and forests occupy areas with higher amplitude and decreasing insolation (Fig. 7). This relationship is not very strong because the effect of insolation is practically insignificant for each land cover type, according to the simple regressions. On the other hand, insolation is valuable in the multiple regression models because it is seldom correlated with other variables and has an important discrete interpretation.

Geology was used as a proxy for the physical and chemical attributes of the soil substrate in the regression models, since available soil maps were not sufficient at this scale. In other studies (Hietel et al., 2004; Martínez, 2011) soil attributes have mostly minor or average influence, although Baumann (2011) found an important influence of cambisols. Geology appears to be one of the most important drivers according to the models (Fig. 8) in this study, however. This may be validly interpreted by considering the fact that geological data were used at the nominal scale, with 11 classes defined as individual binominal (or dummy) variables, and with many of them occurring only in limited areas. Another possible interpretation is that the spatial distribution of individual geological substrate classes carries aggregated information on more landscape attributes. For example, the villages are preferably established on the valley floor. This area has a better correlation with the extent of fluvial sediments, than with low slopes or high TWI. Interpretations based solely on geological substrate type could therefore be misleading. This finding could be an argument for using predictor variables with aggregated information in simple regressions, because these could explain land cover spatial variability more precisely than individual landscape parameters. In multiple regression, however, these variables should be replaced by variables defining landscape properties more specifically to avoid the problems of multicollinearity.

TWI was used to express water availability and soil wetness (Martínez, 2011; Rutherford, Bebi, 2008), but its interpretation appeared to be problematic in this study. Since TWI is derived from the catchment area and the slope, most of its R^2 can be explained by its correlation with slope, rather than as a unique influence. Therefore an alternative index, not derived from slope, may provide better assessment of the actual wetness influence. Another solution is the use of (1) GLMs calibrated with the complex of environmental drivers, and (2) hierarchical partitioning, which would be able to estimate the individual contribution of TWI to the total variance explained by a model (Millington et al., 2007).

4.3 The explanation of land cover classes and land cover changes

GLMs were calculated to assess the overall and combined effect of environmental predictors (drivers) on land cover: several significant findings have been revealed.

The most remarkable finding is the decrease in arable land variability explained by the model during collectivization (Fig. 9). This means that the extent of arable land became less determined by the influence of environmental drivers. The decrease may be interpreted as the effect of agricultural re-organization under cooperative farming, where environmental conditions were not reflected to the same extent as in earlier private farming. The R^2 increase in grassland is associated with this arable land decrease, reflecting the process of direct transition between these two land cover classes as described previously.

The highest R^2 values were attained by the models of forest area variability, concurring with the results of the simple regressions. Their slightly increasing trend indicates that the overall increase in forest area was the optimalization of use of areas unsuitable for agriculture. The ability of the models to explain the spatial distribution of artificial surfaces and permanent crops is relatively low, but they still achieved notable values between 20% and 30%. The artificial surfaces R^2 tended to increase with overall area increase. The permanent crops R^2 decrease can be interpreted by the establishment of orchards in Malachov in the area where fields previously existed and which have different environmental conditions from areas of gardens. The spatial distribution of shrubs is almost completely unrelated to the selected predictor variables, as they exist in a variety of areas, ranging from glades to field boundaries. Dividing them into separate categories, however, would increase their explanation by the models, and this is also our suggestion for other land cover change driver studies that apply the CORINE Land Cover methodology.

Many land cover change studies focus solely on the areas of change (e.g., Martínez, 2011; Millington et al., 2007; Schneider, Pontius, 2001; Tasser et al., 2007). In this study the land cover changes were noticeably explained more poorly by the models, compared to the land cover classes in separate years. Therefore we suggest that focusing on the areas of the land cover class real extent in different years, in addition to the area of change, could help to better understand the spatial driver effects.

Our land cover change models explained agricultural extensification processes better than both agricultural intensification and urbanization, similar to the results of the Rutherford and Bebi (2008) study. Also the processes in the longer period between 1949 and 2011 were evidently better explained. This indicates that total areas of change over this long period were more homogenous than the areas with partial change in subsequent years. In turn, this suggests that extensification and urbanization process drivers act over longer periods, with possible inner fluctuations.

5. Conclusions

This detailed analysis has confirmed that land cover development in these two study areas mostly reflected similar developments to those described in Slovakia more generally. The most important processes were the rapid reduction of arable land, the spread of forests and increases in artificial surfaces, as well as an excessive spread of shrubs and reduction of grassland in the most recently observed period. The minor differences highlighted in this discussion delineate the variability of land cover processes recorded in different areas and at different scales. This finding underlines the need for detailed land cover classifications in other studies at a local level.

The hypothesis, that higher slope, elevation and distance to settlement were related to the classes with lower intensity of use, was mostly confirmed. Generally, slope exhibited notable influences in each model, while elevation and distance from settlement were significant in individual cases. Geology was also important for each land cover class distribution, which was probably caused by the fact that this variable was defined at a nominal scale with 11 geological substrate classes.

The synergic influence of drivers on land cover and its changes was assessed by generalized linear models (GLMs). Forests were the most explicable land cover class (R^2 values ranging from 43% to 53%), while arable land during pre-collectivization and grassland in post-collectivization were also considerably related to the drivers. On the other hand, shrubs were almost completely unrelated to these investigated drivers. The extent of areas of land cover change were not so well explained by the GLMs, although relatively better results were achieved with the analysis of change over a longer time period (up to 22%), and also for the extensification changes (R^2 from 9% to 14%).

The statistical tools used in this study were adequate for depicting and quantifying the relationships between land cover and environmental conditions. Interpretation requires a logical approach, however, as results can reflect not only actual influences but also other effects, including the multi-collinearity of the drivers and differences due to the mixed use of nominal and interval scaled data.

Land cover change is influenced by a much greater number of spatial drivers than those assessed by our models, including the area's biophysical conditions, structural properties and socio-economic background. Land cover change itself, moreover, remains dependent on landowners who decide on the usage or abandonment of a particular area (Gellrich et al., 2007; Van Doorn, Bakker, 2007). In conclusion, the most valuable variables which could increase the explanatory power of statistical models should reflect real land use decision-making processes.

Acknowledgements

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THE STATE OF THE FUTURE INDEX FOR THE CZECH REPUBLIC

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Abstract

The potential development of the Czech Republic is discussed in this paper by using the State of the Future Index (SOFI). This is the only index currently used worldwide that focuses not only on the present (unlike the Human Development Index and others), but also on the future development of opportunities and threats. The paper presents the computation of partial indices focusing economic, demographic, social and environmental factors, where the selection of indicators that enter the computations, including their weighting, is the outcome of a survey conducted among regional development and sustainability experts and academics.

Shrnutí

Index stavu budoucnosti pro Českou republiku

Článek se věnuje hodnocení potenciálu rozvoje České republiky pomocí indexu stavu budoucnosti (SOFI). Tento index, používaný v současnosti na celém světě, je jediným, který se zaměřuje nejen na současnost (na rozdíl od indexu lidského rozvoje a dalších), ale také na budoucí vývoj příležitostí a hrozeb. Příspěvek prezentuje výpočet dílčích indexů zaměřených na ekonomické, demografické, sociální a environmentální faktory, kde výběr ukazatelů, které vstupují do výpočtů, včetně jejich váhy, je výsledkem dotazníkového průzkumu mezi odborníky, kteří se věnují otázkám regionálního rozvoje a jeho dlouhodobé udržitelnosti.

Key words: Human Development Index (HDI), State of the Future Index (SOFI), Czech Republic

1. Introduction

The most commonly used indicator of economic output is gross domestic product (GDP). GDP is a total monetary value of all goods and services produced during the period measured (usually one year) within a country's borders. In short, it indicates the economic performance of a country. International analyses most often work with GDP per capita. GDP consists of consumption (household and government expenditures), investments, and net exports (i.e. the difference between exports and imports). Gross national product (GNP) is a similar indicator measuring the value of goods and services produced by citizens of a country, regardless of whether it was within the country's borders.

Since 1990, the United Nations Development Program (UNDP) has been using an alternative indicator, which should also reflect the life quality of the population and not just its economic performance. It is the Human Development Index (HDI). The philosophy behind the index is based on the belief that life quality depends mainly on:

- a long and healthy life;
- access to knowledge; and
- access to sources ensuring a decent standard of living.

Therefore, HDI is defined based on the following four indicators (Desai, 1991), which reflect to what extent basic human needs are met:

- life expectancy[1];

- gross domestic product at purchasing power parity[2];
- literacy[3]; and
- number of the years of schooling[4].

The fact that two of these indicators include education points out the weight (importance) of the indicator.

A host of authors (Kelley, 1991) focus on contrasting the gross domestic product and the human development index. Comparing the ranking of countries by GDP and the HDI leads to some interesting interpretations. For example, former socialist countries still achieve higher ranking of HDI than GDP thanks to their emphasis on literacy, education, and basic health care for all. Of non-socialist countries, Costa Rica has a significantly higher HDI than GDP (World Bank, 2011). In contrast, countries exporting oil, especially in the Middle East, score much lower HDI values compared to GDP. These unfavourable HDI values are probably caused by the unequal position of women, reflected in their lower literacy, and by major social differences (a highly unequal distribution of wealth). Some studies, however, criticize HDI (Sagar, Najam, 1998; Lind, 1991), possibilities of its calibration (Lind, 2010) and modification (Noorbakhsh, 1998).

Another indicator, which has become an alternative or supplement to GDP, is the ecological footprint (Caballero, 2009; Ruževičius, 2011; Amin, 2009). The ecological footprint describes the consumption of natural

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[1] Life expectancy at birth, or average life expectancy, is the age a newborn infant would live to if the prevailing patterns of mortality remained the same throughout its life.

[2] GDP at purchasing power parity reflects different price levels in different countries.

[3] The population's literacy rate is given by the percentage of people over the age of 15 who can, with understanding, both read and write a simple statement related to everyday life.

[4] The number of the years of schooling is a combined conversion of years spent at elementary school, middle school, and college.

resources in the form of "global hectares per person", which is a unit comparing the consumption of natural resources and the actual capacity of the biologically productive land on the Earth[5]. One great advantage of the ecological footprint lies in the fact that it can be evaluated at a global, national, local, and even individual level.

While the total ecological footprint of the world's population is 3.1 global hectares per capita, the total ecological capacity is only 2.1 global hectares (as of 2010). This shows that human activities exceed the global ecological capacity by one global hectare per capita. Each inhabitant of the Czech Republic uses up to 5.3 hectares of the ecological footprint but the ecological capacity of the country is only 2.3 global hectares per capita. This makes the ecological deficit more than double. (World Wide Fund for Nature, 2010).

A dramatically different indicator quantifying the performance of a country and its population is "gross national happiness" (GNH). Gross National Happiness attempts to define the quality of life more holistically than GDP, emphasizing the non-materialistic aspects of life. The term was first introduced in 1972 by the King of Bhutan, Jigme Singye Wangchuck, who opened up Bhutan to the age of modernization (Zurick, 2006). Conventional development models consider economic growth to be the most important objective. The GNH concept is based on the assumption that human society can develop when material and spiritual development go hand in hand and complement one another. The four pillars of GNH are: promotion of sustainable development, preservation and promotion of cultural values, protection of the natural environment, and establishment of good governance. The Centre for Bhutan Studies (a major research centre in Bhutan) bases the GNH computation on surveys that serve to express approximately 70 indicators (divided into thematic areas, "indexes") and dimensions on a relative scale (e.g. "frequency of meditation" falls into three groups: never, sometimes, daily; "incidence of suicidal thoughts" is a dichotomous variable: yes, no).

2. The State of the Future Index (SOFI)

So far, the State of the Future Index has been the only variable that not only looks at the present but also tries to identify the development trends of selected variables (indicators). It was coined by Theodore J. Gordon, researcher in the Millennium Project (currently the largest forecasting project worldwide).

At a global level, the State of the Future Index is a statistical combination of 28 key indicators of the state of society, which shows whether the situation is going to improve or deteriorate. SOFI is based on the assessment (through repeated surveys) carried out by selected experts, who identify issues and trends conditioning future development (within a time horizon of 10 years). As part of the surveys, experts estimate the weight of each indicator, as well as events that have not occurred yet but, if they do, their impact would be strong (positive or negative) on the development of the society (Gordon et al., 2011).

Based on available data, the global SOFI was evaluated for the past 20 years, which allowed for a plausible forecast of future trends over roughly the next 10 years. Although
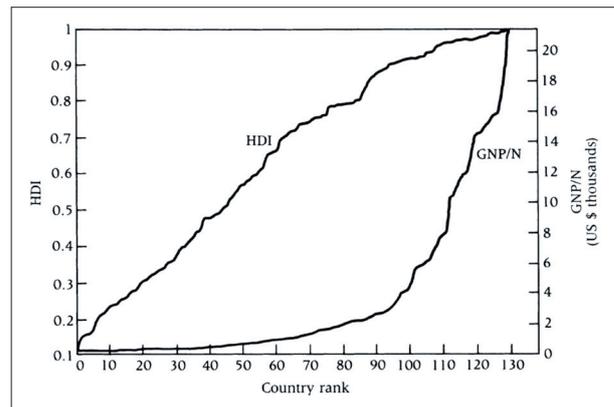

Fig. 1: Ranking of countries by HDI and GNP/N
Source: Kelley, 1991

the total SOFI improved over the past two decades, this positive trend is likely to slow down in the coming decade. By constructing one aggregated index, we lose track of the development of individual sub-indicators. Even with the overall index improving, it may happen that one of the indicators will significantly deteriorate (e.g. an increase due to terrorist attacks). It is therefore advisable to provide, not only the resulting index (designed at global, national and local levels), but also the development of individual indicators. It is also important to pay attention to finding the most accurate and reliable data possible and to identify any possible changes in time.

The 28 indicators assessed at the global level can be divided into four groups, based on how their values developed in the past 20 years and on their likely development in the next decade (Gordon et al., 2011):

1. indicators that improved in the past 20 years and the trend is likely to continue (e.g. adult literacy, the number of internet users, life expectancy at birth, and the number of women in parliaments);

2. indicators that improved in the past 20 years, but the trend may change owing to the economic recession (e.g. access to drinking water, people living in extreme poverty, R&D expenditure, food availability, and the number of refugees);

3. indicators that deteriorated in the past 20 years, but could improve in the coming 10 years (e.g. people voting in elections, forestlands and the prevalence of HIV); and

4. indicators that deteriorated in the past twenty years, and the trend is likely to continue over the coming 10 years (e.g. the level of corruption, CO_2 emissions, unemployment rate and temperature anomalies on the Earth's surface).

This article focuses on the State of the Future Index for the Czech Republic, which has recently experienced social, environmental, and economic development connected with the collapse of the socialist state and subsequent transformations. The aim of the research was to adapt the methodology for computing SOFI for the Czech Republic, with a detailed case study comparing the results with HDI, and computing partial SOFIs for selected variable categories, including the assessment of their relationship and significance against the overall SOFI.

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[5] The amount of most resources we consume and the waste we produce can be converted into a physical area. A total of the areas, made up by resource consumption and human waste production, generates an "ecological footprint". If an area corresponding to the ecological footprint of the population exceeds the land area of the country, the population is basically using the productive area of people from other countries or is doing so at the expense of future generations.

3. Research methods

The first stage of the research involved the selection of indicators appropriate for the computation of a SOFI for the Czech Republic. We first proceeded from similar projects, especially from variables considered in the computation of the global SOFI (Glenn at al., 2011), while adapting the criteria to the specific characteristics of development in the Czech Republic. In order to assess the dynamics of development in various areas, we selected variables from four categories (economic, demographic, social, and environmental), which facilitated the computation of partial SOFIs. The computation of the total SOFI included the values of all indicators. A survey was conducted to enable experts and academics dealing with sustainable development, regional geography and regional development, to comment on the quantity and selection of the characteristics. Their recommendations to expand or narrow down the list of variables were respected.

Since not all variables are equally important, we proceeded to weight them. Each variable was given a weight from 1 to 10 (1 – minimum; 10 – maximum) by the respondents and this was reflected in the subsequent computation. Experts also commented on the estimate of two values (best and worst) for each indicator in 2020. The average values of the weights and forecast data for 2020 were computed using the arithmetic mean. The questionnaire survey was conducted online, addressing 72 experts, mainly academics from Czech and Slovak universities. The total return of the questionnaires reached 42%; responses were assessed from thirty respondents.

The study uses nine economic, ten environmental, eleven demographic, and eleven social indicators (Tab. 1). Their legitimacy and balance in each category is demonstrated by the average weight of individual groups (computed as arithmetic mean of the weights of indicators in each category). Differences ranged within two-tenths (5.7 to 5.5), and the

ECONOMIC		ENVIRONMENTAL	
1	Unemployment – gross unemployment rate (%)	10	CO_2 emissions – emissions in tons/year/1,000 inhabitants
2	Gross domestic product – GDP per capita (CZK)	11	Environment protection investments – amounts (CZK) invested in environment protection.
3	R&D expenditure – R&D expenditure relative to GDP (%)	12	NO_x emissions – emissions in tons/year/1,000 inhabitants
4	Gross pay – average gross pay (CZK)	13	SO_2 emissions – emissions in tons/year/1,000 inhabitants
5	Efficiency of electricity use – GDP (USD PPP) per unit of energy used (in kg of oil equivalent)	14	Connection to public sewers – proportion of households connected to public sewers
6	Direct foreign investments – proportion of GDP (%)	15	PM10 emissions – emissions in tons/year/1,000 inhabitants
7	Tourists – accommodated foreign guests per 1,000 inhabitants	16	Proportion of treated wastewater – (%)
8	Highways – length of expressways per 1,000 inhabitants	17	NPK fertilizers – fertilizer consumption in kilograms per hectare of arable land
9	Vehicle ownership rate – number of inhabitants per vehicle	18	Proportion of protected areas – as related to the total area
		19	Logging (salvage) – salvage logging (thousand m^3/1,000 ha)
DEMOGRAPHIC		SOCIAL	
20	Natural population change – population growth per 1,000 inhabitants	31	Elections – people voting in the elections to the Chamber of Deputies of the Parliament of the Czech Republic (%)
21	Ageing index – proportion of seniors to children	32	Pension – average pension (CZK)
22	Economic load index – proportion of people aged 14 and younger, along with the volume of people aged 65 and older, per number of people aged 15 to 64	33	Crime – crimes per 1,000 inhabitants
23	Life expectancy – life expectancy at birth (in years)	34	Internet provision – proportion of households with access to the Internet (%)
24	University graduates – proportion of university-educated population	35	Computer provision – proportion of households with a computer (%)
25	Diseases of the circulatory system – proportion of deaths from diseases of the circulatory system of total deaths	36	Physicians – physicians per 1,000 inhabitants
26	Migration – migration balance per 1,000 inhabitants	37	Violent crimes – violent crimes (homicides) per 1,000 inhabitants
27	Divorces – divorces per 1,000 inhabitants	38	Social benefits – expenditure on social benefits (CZK/1,000 inhabitants)
28	Suicides – suicides per 1,000 inhabitants	39	Homes for the elderly – beds for the elderly per 1,000 seniors
29	Abortions – abortions per 1,000 inhabitants	40	Culture – cultural centres per 1,000 inhabitants (theaters, cinemas, monuments, museums, and galleries)
30	Foreigners – foreigners per 1,000 inhabitants (foreign worker visas)	41	Libraries – libraries per 1,000 inhabitants

Tab. 1: List of indicators included in the SOFI computation for the Czech Republic

top fifteen most important indicators (based on the average weight assigned by experts) included four indicators in each of the economic, environmental and demographic areas, and three social indicators. According to the experts, the following indicators have the highest weight: unemployment, GDP per capita, R&D expenditure, natural population change, and CO_2, NO_x, and SO_2 emissions (Tab. 2).

Using mathematical models based on a twenty-year time series, the authors of the global SOFI forecast values for each variable for the following years, usually a 10-year span (until 2020; Gordon et al., 2011). With regard to the availability of statistical data and their consistency, our research had to suffice with a fifteen-year time series of 1995–2010. With the help of regression analysis methods,

Variable	Weight	2020			Regression model
		Best forecast value	Worst forecast value	Model value	
1	7.36	6.52	15.77	7.80	MoF forecasts
2	6.85	517,952.38	370,952.38	434,042.45	MoF forecasts
3	6.85	3.35	1.45	3.00	Linear
4	6.50	36,908.70	29,038.64	31,208.72	MoF forecasts
5	5.04	7.43	7.59	7.00	MoF forecasts
6	4.88	4.95	2.04	5.20	MoF forecasts
7	4.08	822.24	610.71	694.31	Power trend line
8	3.92	0.24	0.14	0.15	MoF forecasts
9	3.65	1.40	1.60	1.40	Exponential trend line
10	6.43	11.02	16.74	12.90	Rational model
11	6.36	35.84	23.05	25.74	Estimate
12	6.17	8.83	12.48	11.40	Rational model
13	6.04	8.82	14.04	14.74	Bleasdale regression model
14	5.91	90.42	83.93	89.52	Exponential
15	5.87	0.48	1.50	0.60	Reciprocal
16	5.86	98.71	96.06	96.94	Logarithmic
17	5.41	91.55	99.77	102.17	Logarithmic
18	4.91	16.55	14.37	15.50	Estimate*
19	4.78	0.67	0.97	1.15	Weibull regression model
20	6.67	1.11	0.30	0.10	CZSO population projections
21	6.42	134.01	149.63	139.00	CZSO population projections
22	6.29	41.25	46.65	64.00	CZSO population projections
23	6.00	77.59	74.85	77.20	CZSO population projections
24	4.71	2.51	3.37	2.93	Linear
24	5.83	16.90	13.42	14.95	Linear
25	5.54	557.50	784.43	511.92	Exponential
26	5.13	1.84	1.15	3.00	CZSO population projections
28	4.63	0.10	0.17	0.14	Logarithmic
29	4.62	2.34	3.61	2.56	Exponential
30	4.21	57.34	43.19	50.00	CZSO population projections
31	6.32	68.84	43.78	56.99	Power
32	6.29	19,084.95	15,192.67	11,643.03	Power
33	6.09	23.95	31.63	26.82	Exponential
34	6.09	80.50	65.36	85.67	Logarithmic
35	6.00	80.90	67.09	90.20	Logarithmic
36	5.86	5.13	4.16	4.93	Linear
37	5.73	0.02	0.03	0.01	Exponential
38	5.62	3,991.75	3,050.00	4,106.96	Power
39	5.59	26.01	21.76	25.64	Linear
40	5.05	4.12	3.67	3.73	Logarithmic
41	4.41	0.80	0.52	0.47	Exponential

Tab. 2: Overview of the weights of individual variables; mathematical model and forecast
*Brdy Protected Landscape Area planned from 2016 (330 km², i.e. about 0.4% of CR); CZSO = Czech Statistical Office

we used them to model data for the period 2011–2020. The SOFI computation, then, includes time series from 1995 to 2020.

3.1 SOFI computation

The State of the Future Index is computed in five steps:

1. value forecasting (2011–2020 in our case);
2. computation of the 1995–2020 mean;
3. definition of the upper good and lower bad limits, maximum and minimum;
4. data standardization and weighting; and
5. final computation of the State of the Future Index.

Item 1:

Estimates of individual characteristics for 2012–2020 were based on the mathematical modeling using the statistics software CurveExpert Professional, Statistica and MS Excel. For each indicator, a mathematical regression model with maximum possible reliability was computed, based on which the future values were modelled. We used the latest demographic forecasts only for demographic indicators – always the medium variant (Burcin, Kučera, 2010), while for economic indicators it was the forecasts of the Ministry of Finance (MoF), also the medium variant.

Item 2:

Label each variable with a_i and the value of the variable in a given year with $a_i year$. First, we work with matrix A (26 rows: the years 1995–2020, and k-columns in general, in our case k = 41: number of variables):

$$\{A\} = \begin{matrix} a_1^{1995} & a_2^{1995} & \ldots & a_k^{1995} \\ a_1^{1996} & a_2^{1996} & \ldots & a_k^{1996} \\ . & . & \ldots & . \\ . & . & \ldots & . \\ . & . & \ldots & . \\ a_1^{2020} & a_2^{2020} & \ldots & a_k^{2020} \end{matrix}$$

Each variable has its weight: w_i

Each variable has an estimate of the best (a_b) and worst (a_w) value for 2020.

Compute the average value for each variable for the period of 1995–2020: $\bar{a}_i = \sum a_i^{year}/26$.

Item 3:

Establish a maximum (a_i^{max}) and minimum (a_i^{min}) for each variable in the period of 1995–2020 and determine the upper good limit (U_{ai}) and lower bad limit (L_{ai}) as a maximum and minimum from a_b; a_w; a_i^{max}; a_i^{min} based on the importance of each variable (depending on whether a higher value of the indicator is positive or negative, e.g. the higher the GDP the better, and the opposite with unemployment).

Item 4:

Standardize data from the original matrix A (the result is a new matrix $B = (b_i^{year})$), using the equation: $b_i^{year} = (a_i^{year} - \bar{a}_i) / (U_{ai} - L_{ai})$:

$$\{B\} = \begin{matrix} b_1^{1995} & b_2^{1995} & \ldots & b_k^{1995} \\ b_1^{1996} & b_2^{1996} & \ldots & b_k^{1996} \\ . & . & \ldots & . \\ . & . & \ldots & . \\ . & . & \ldots & . \\ b_1^{2020} & b_2^{2020} & \ldots & b_k^{2020} \end{matrix}$$

Weight each variable by multiplying each column representing one of the k-variables with a corresponding weight. The result is a matrix $C = (c_i^{year})$,

where $c_i^{year} = b_i^{year} \cdot w_i$,

$$\{C\} = \begin{matrix} c_1^{1995} & c_2^{1995} & \ldots & c_k^{1995} \\ c_1^{1996} & c_2^{1996} & \ldots & c_k^{1996} \\ . & . & \ldots & . \\ . & . & \ldots & . \\ . & . & \ldots & . \\ c_1^{2020} & c_2^{2020} & \ldots & c_k^{2020} \end{matrix}$$

Item 5:

Compute the SOFI for each year, $SOFI^{year} = \sum c_i^{year}$, the index per year is a sum of values in one respective row of matrix C. All SOFI values were subsequently qualified in relation to the 2006 value.

4. Results and commentary

4.1 Partial SOFI

Economic

For the period of 1995–2010 the economic SOFI curve shows a predominantly growing trend (Fig. 2). Its course and fluctuation are most affected (based on importance) by the unemployment rate (7.4), gross domestic product (6.8), and R&D expenditure (6.8). The development of these economic indicators varies. Indicators with a high weight tend to grow, or have a relatively favourable development, and thus affect the index trend in a significantly positive way: e.g. gross domestic product rose from CZK 148.5 thousand per capita (1995) to nearly CZK 359 thousand per capita (2010). R&D expenditures did not even reach 1% of GDP in 1995, while in 2010 they neared 1.6% of GDP.

The initial unfavourable development of the unemployment indicator negatively affects the economic SOFI trend. This is due to the transformation of the economy, where the transition of state enterprises into private ownership is beginning to show, and the worse economic situation in the country in the late 1990s. The decline stops in 2000, with the unemployment rate reaching 8.8%. In the following period, the unemployment development curve behaves erratically, but in 2004–2008 it falls sharply (to 4.4%), affecting the index very positively. The economic recession begins to show on the Czech labor market in 2008; unemployment grows again, which is negatively reflected in the overall economic SOFI.

At the beginning of the monitored period, most of the variables included in the computation of the economic SOFI increase, which is reflected in the rapid growth of SOFI. The decrease in 1999–2000 is caused by the rise of unemployment. In 1995, the value of the economic SOFI of the Czech Republic was 0.78 of the 2006 value, while in 2002 it was almost 1.

2003–2004

In 2002 and 2003, the situation deteriorated and the index fell from 0.98 to 0.85 of the 2006 value, thanks to rising unemployment and a significant drop in foreign direct investment, whose share in GDP fell from 11.3 to 2.2%.

2004–2007

In this period, the economic SOFI strengthened significantly, as it reached 1.15 times the value of 2006 in 2007. The period is characterized by a gradual fall in unemployment and a favourable growth in most of the other indicators.

2008–2009

Between 2007 and 2009, the Czech Republic began to feel the growing economic crisis, which resulted in a drop of the economic SOFI. Its value fell from 1.15 to 1.07. Much of the decline in the index was caused by increased unemployment and decreased GDP, as well as by a negative trend of lower weight indicators.

2010–2020

Based on the forecasts of the Czech Ministry of Finance (namely the medium variant), the economic SOFI is expected to grow gradually but slowly until 2020. The forecast is based mainly on a return to at least moderate economic growth, stagnation or a slight fall in unemployment.

Demographic

The development of the SOFI demographic curve (Fig. 3) is most affected by five indicators with the highest weight: natural population change (weight 6.7); age structure variables – ageing index (6.4) and economic load index (6.3); followed by life expectancy (6.0); and the proportion of university-educated population (5.8). From 1995 to 2010, these indicators changed rather dynamically, with varied behaviour. From the beginning of the monitored period, the ageing index deteriorated year-on-year (from 0.72 in 1995 to 1.11 in 2011); this negative

trend is projected to continue until it reaches the expected value of approximately 1.39 in 2020. While the economic load index was falling from 0.46 (in 1995) to 0.40 in 2007, its value has been increasing again since 2008 (0.45 in 2011) and the unfavourable trend is expected to continue to reach 0.64 in 2020.

Natural population change develops dynamically. Within the monitored period, it is mainly affected by natality, as mortality (crude death rate) has oscillated only minimally. Natality expressed as crude birth rate, has slumped since the early 1990s, from 12.5 (1990) to 8.8 (1996). Virtually constant until 2001, it began to grow in 2002 thanks to the 1970s baby boomers, who reached their reproductive age, and mothers who had postponed childbirth in the nineties. By 2008, it had peaked at 11.5, when it started to gradually decline; this trend is expected with slight fluctuations until 2020. As the crude mortality rate ranges slightly above 10, the values of natural population change were negative until 2005, where they turned positive, and this trend should continue until 2020.

The other two indicators of the five with the highest weight show a positive development in the entire period of 1995–2010, and the same trend is expected in the near future. The proportion of university-educated population grew (for population aged over 15) from the nineties
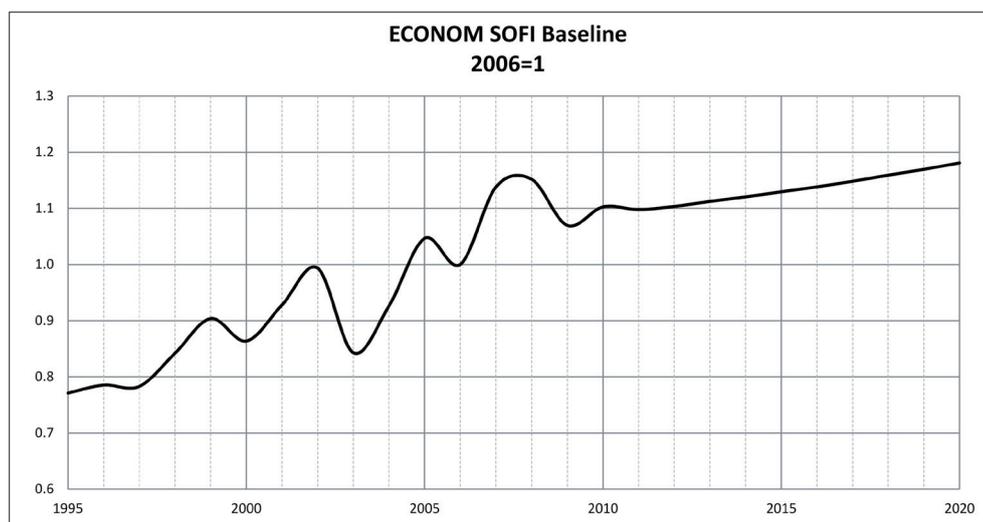

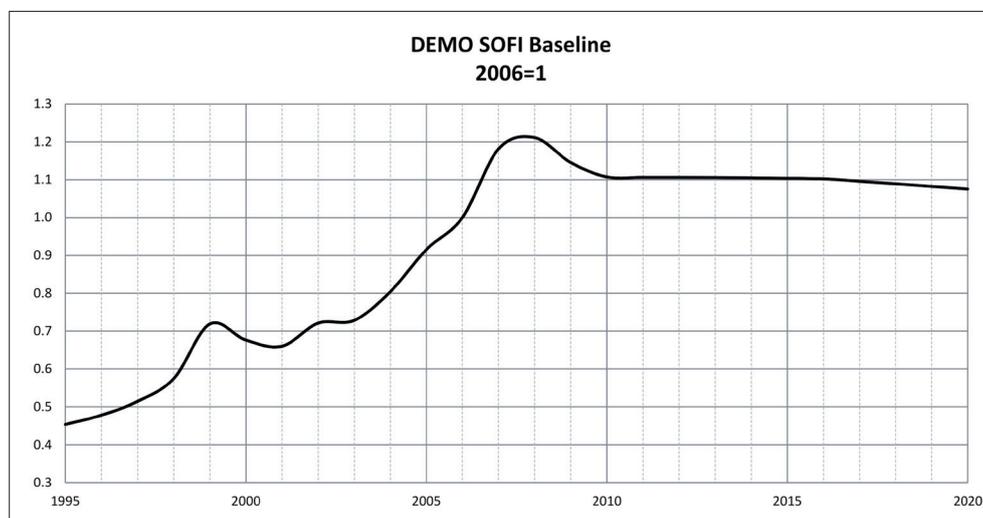*Fig. 2: Development of the economic SOFI 1995–2020*

Fig. 3: Development of the demographic SOFI curve

from approximately 6.5% (1991) through 8.9% (2001) to over 14% (2011). While at 69.7 in 1995, life expectancy for men was as high as 74.4 in 2010, and the forecast for 2020 exceeds 77.

The development of the above five indicators heavily influences the SOFI demographic curve, the course of which can be divided into five stages of varying duration.

1995–1998

A period distinguished by index growth, where most demographic characteristics have a favourable trend, with the exception of the ageing index, which, however, grows continuously for the entire time.

1999–2002

The index stagnates, which is caused by the unfavourable development of natural population change; within this period, life expectancy practically does not grow. The stagnation also reflects selected indicators of lower weight, which score nearly the worst values – especially the number of suicides and a negative migration balance.

2003–2007

There is a very positive trend caused by a significant increase in the birth rate and natural population change.

2008–2010

The index values fall due to the stagnation and decline in birth rates, and the trend of the economic load index switches from being positive to negative.

2011–2020

Based on the demographic indicators forecast until 2020, we expect the State of the Future Index to stagnate or drop slightly. This is due to the expected drop in natural population change and the unfavourable development in the age structure of the Czech population, i.e. indicators with high weight.

Social

The computation of the social SOFI (Fig. 4) reflects eleven indicators. Experts attributed the highest weight to the indicators of people voting in elections (6.3), average pension rate (6.3), and crime (6.1). At the beginning of the monitored period, the index curve is stable, oscillating slightly around 0.4 (relative to 2006). From 1998, the index was growing, with one exception – in the period from 2006 to 2008. We expect a similar positive trend for the forecast period until 2020.

From 1995 to 2010, indicators developed with considerable differences in their behaviour. Variables monitoring the number of physicians, pension levels, and households with computer and internet access continued to grow, positively affecting the overall social SOFI. On the other hand, violent crime saw a downward trend, which also had a positive impact on the index. Variables with a deteriorating trend, which affect the overall social SOFI negatively, include public libraries and people voting in elections.

The other indicators fluctuated in the monitored period. Negatively affecting the index, crime continued to grow slightly until it reached over 40 crimes per 1,000 inhabitants in 1999, when it began to fall and affect the social curve positively. The variable monitoring beds in homes for the elderly grew until 2007 (except from 2004 to 2006), which had a positive impact on the social SOFI. However, the number of the beds was reduced significantly after 2007, which had a negative effect on the SOFI. Despite declining at first, cultural centres rose again slightly, but as this indicator is of very little importance, it does not affect the SOFI substantially.

Social benefits are the most problematic indicator included in the calculation of the social SOFI. The problem with this indicator is that it is very difficult to establish an optimum level of welfare. For many people this aid is the only income ensuring a decent standard of living. On the other hand, there are also people who are not interested in securing a job, who abuse the welfare system. Therefore, academics, state organizations, and the public need to open a discussion on this topic, which our research does not include, in order to establish the optimal level of social benefits.

1995–1998

In this period, the total index saw hardly any growth, ranging around 0.40 of the 2006 value.

1999–2007

In these years, the social SOFI index grew quite fast, with nearly all the indicators showing a positive development. In 2007, the social SOFI equalled 1.03.

2008–2010

Following a period of strong upturn, the social SOFI index fell, mainly due to a slowdown in the growth of pensions, a drop in the number of people voting in elections and beds in homes for the elderly, a cut in social benefits, and a reduced
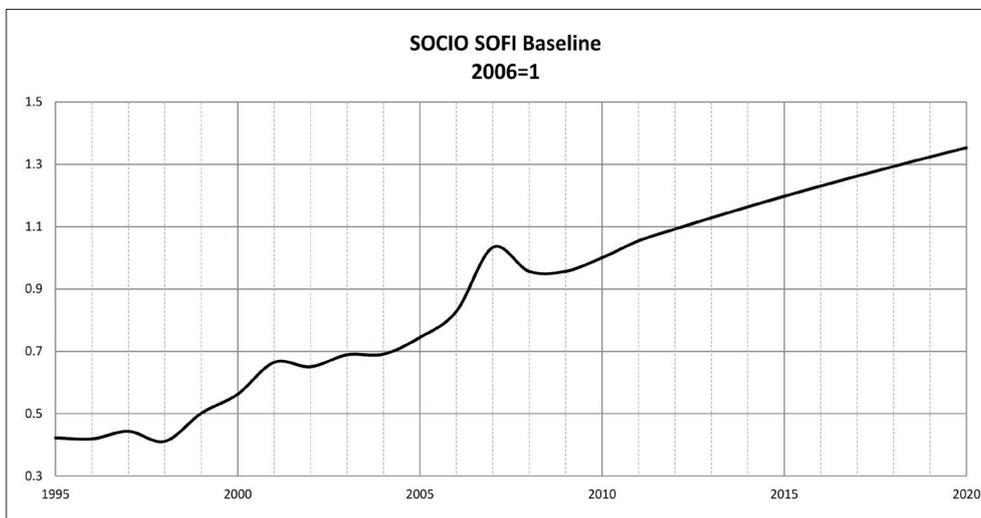

Fig. 4: Development of the social SOFI curve

number of cultural centres and libraries. In this period, the index weakened to 0.96.

2011–2020

In this decade, the social SOFI is projected to grow slightly until it reaches around 1.35 towards the end of the monitored period.

Environmental

Indicators with the highest weight and impact on the development of the environmental SOFI curve (Fig. 5) include CO_2 emissions (6.43), investments into environment protection (6.36), NO_x emissions (6.17), followed by SO_2 emissions (6.04), and finally connection to public sewers (5.91).

From the beginning of the monitored period until 1999, air pollution emissions recorded a sharp downtrend. This was most noticeable with CO_2, of which there were 311,000 tons released in 1995; by 2000, the amount had dropped to less than a half – 146,000 tons. From 2000 to 2005, the production of the monitored emissions remained at the same level. The year 2007 saw an increase, with 180,000 tons of released pollutants. This was followed by yet another decline in the following years, also due to the economic downturn and cuts in industrial production. A trend similar to CO_2 emissions was observed in the other released pollutants, too.

According to experts, the indicator of the second highest weight was investments into environment protection. While in 1995 they amounted to CZK 32 billion, in 1997 investments for environment protection reached CZK 40.5 billion, a maximum for the whole period in question. The large funds spent in the nineties reflected the then poor environmental conditions. The main task was to desulphurize coal power plants and to upgrade the pipeline infrastructure. Since 1998, this trend has seen a downturn, and funds invested into the environment began to drop: in 2002, merely CZK 14 billion were spent to protect the environment, which in the following years stabilized at CZK 20 billion per year. The 2020 outlook expects the current trend of investment to continue.

The economic performance of the Czech Republic remains an important factor influencing the level of investment into environmental protection. The last of the five indicators with the highest weight is the number of inhabitants connected to the public sewage system. Since 1995, the

number of inhabitants connected to public sewers has risen exponentially. At the beginning of the monitored period, 73.2% of inhabitants in the Czech Republic were connected to public sewers, while in 2010, the number shot up to 81.2%. In the coming years, this trend will most likely continue. A factor affecting the increasing proportion of inhabitants connected to public sewers is the European funds. Largely because of these investments, which are largely covered by the European Union, municipalities are able to co-finance the construction of sewers, for which they would normally lack sufficient resources. Another reason behind the increase of inhabitants connected to sewers and also in waste water treatment is Act No. 254/2001 Coll. regulating water and amendments to certain other acts (Water Act), which obliges municipalities with over 2,000 equivalent inhabitants to ensure wastewater drainage and treatment by the end of 2010.

1995–1999

This period is characterized by an index upturn, mainly due to the rapid reduction in the monitored CO_2, NO_x, PM10 and SO_2 emissions, as well as due to large investments in environment protection.

2000–2002

The index values fall mainly due to a major drop of investments into environment protection, while characteristics related to released emissions remain at the same level.

2003–2006

In this period, the index follows an improving trend chiefly thanks to increased investments into environment protection and the diminishing amount of emissions.

2007–2010

Following a slump in 2007, with the largest amount of CO_2 pollutants released since 2000, the trend turns positive again and the index rises. Another reason behind the 2007 decline was salvage logging due to a wind calamity; this had a negative impact on the environmental SOFI.

2011–2020

It is extremely difficult to estimate emissions to be released to 2020. The SOFI model anticipates a slight drop in emissions considering the general trend of cuts in these pollutants in the Czech Republic and in Europe in general. Together with
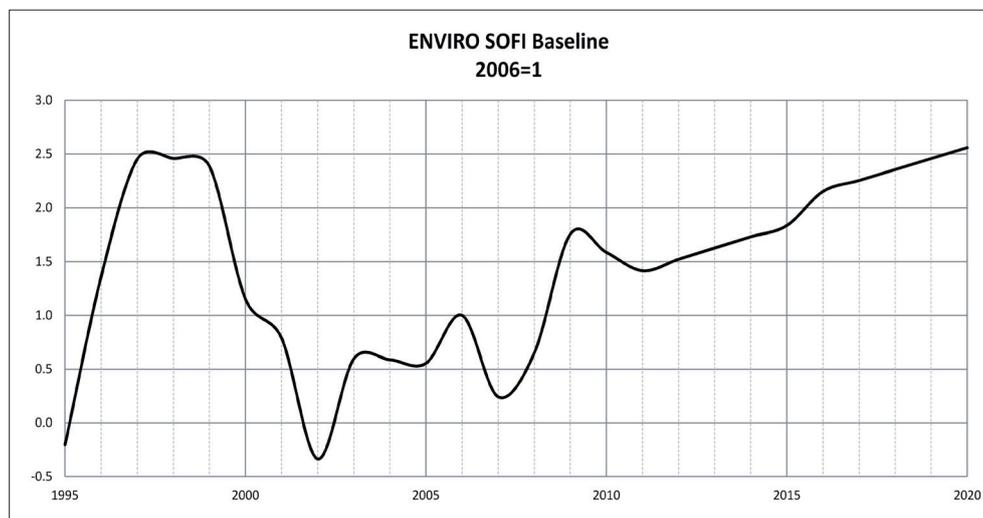

Fig. 5: Development of the environmental SOFI

slowly increasing expenditures on environment protection and stricter limits for the largest emitters, the SOFI model suggests a slowly improving trend.

Conclusion

The overall State of the Future Index for the Czech Republic shows a growing trend virtually for the entire monitored period. It is correlated most with the economic, demographic, and social SOFIs (Fig. 6), as measured by the Pearson correlation coefficient (0.97, 0.96, and 0.93 respectively). In contrast, the overall SOFI trend differs from the environmental index, which behaves quite erratically and is therefore not included in Figure 6.

The total SOFI index is determined by environmental indicators chiefly in the early years (1995–1999), with a positive effect. This is due to high investments into the environment and a sharp drop in emissions in the 1990s. As a result, the overall SOFI grows relatively dynamically despite the fact that the partial social or demographic SOFIs tend to stagnate. The setback in 2000–2004 is related to stagnation or slight decline in virtually all partial SOFIs. Similarly, the index stagnates in the 2007–2011 period, as most of the indicators mirror the consequences of the economic recession and the positive demographic trends slow down.

The comparison of the HDI and SOFI in the Czech Republic (Fig. 7) from 1990 to 2011 reveals that their respective curves

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
HDI	0.788	0.794	0.799	0.805	0.810	0.816	0.824	0.831	0.839	0.846	0.854	0.858	0.861	0.864	0.863	0.865
SOFI	0.468	0.556	0.620	0.696	0.829	0.803	0.838	0.834	0.828	0.870	0.973	1.000	1.101	1.109	1.120	1.133

Tab. 3: Czech Republic HDI and SOFI values. Source: UNDP, authors' calculations
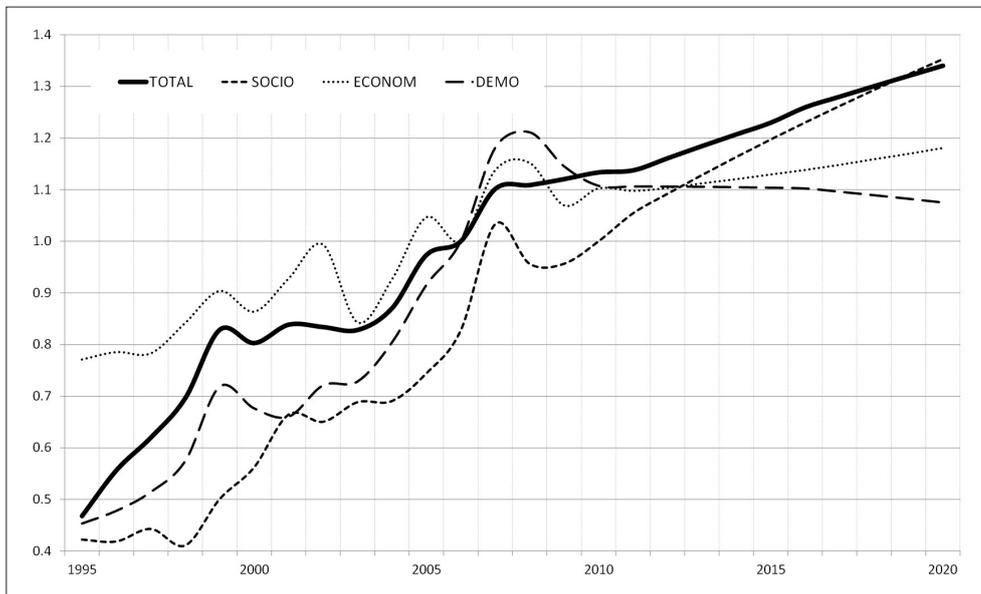*Note: HDI values for years in which the Index was not computed have been interpolated*

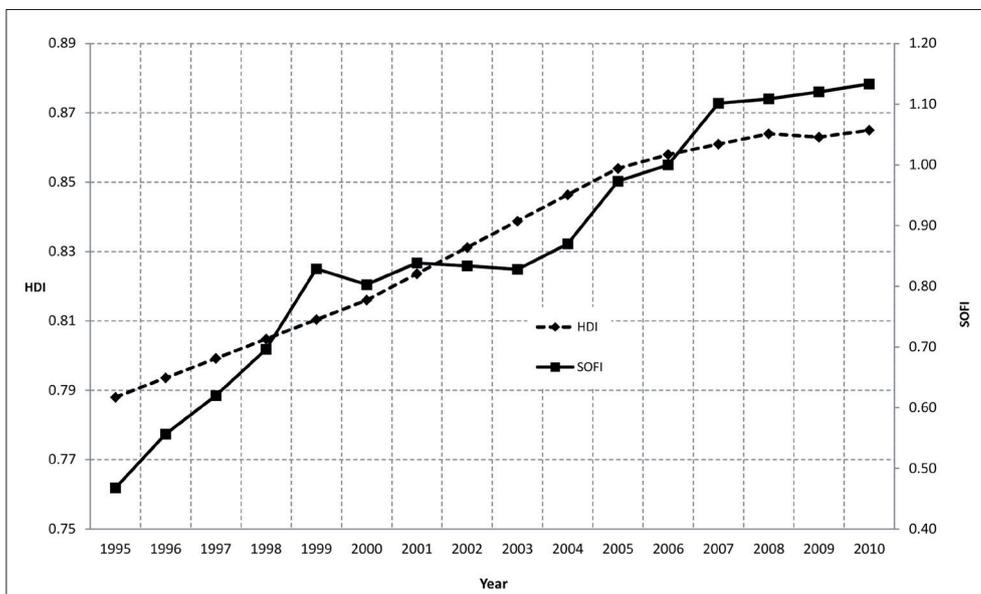*Fig. 6: SOFI compared to partial SOFIs*

Fig. 7: Comparison of the SOFI and HDI for the Czech Republic

follow a very similar trend; this is expected to continue in the near future as well. Statistically, the HDI and SOFI values significantly correlate (from 1995 to 2010 the correlation coefficient equaled 0.96), which establishes SOFI as a relevant indicator of the country's possible future development.

Combining a wide range of variables, the State of the Future Index is designed to indicate whether we should expect a favourable or unfavourable development in the future. Based on our results it is clear that in the case of the Czech Republic the development will be rather positive, even if much slower than at the turn of the 21st century. As the computation of a national SOFI facilitates the comparison of the potential development of all countries, our following research will focus on juxtaposing a possible development of the V4 countries and on the regions of the Czech Republic.

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THE IDENTIFICATION OF RESIDENTS WITH THEIR REGION AND THE CONTINUITY OF SOCIO-HISTORICAL DEVELOPMENT

Miloslav ŠERÝ

Abstract

The regional identity of inhabitants in typologically different regions, which differ mainly in terms of the continuity of their socio-historical development, is examined in this article using the example of two case study areas. An important dimension of the concept of any population's regional identity is the phenomenon of the identification of inhabitants with their region, and this is subject to analysis in this paper. The research demonstrated that a stronger form of the identity phenomenon could be reported for the case study region in which socio-historical development had an uninterrupted continuity. The observed findings helped to confirm the importance of long-term processes in a region's formation.

Shrnutí

Identifikace obyvatel se svým regionem a kontinuita socio-historického vývoje

Příspěvek se zabývá komparací regionální identity obyvatel v typologicky rozdílných regionech, lišících se zejména v kontinuitě socio-historického vývoje, a to na příkladu dvou modelových území. Důležitou dimenzí konceptu regionální identity obyvatel je fenomén identifikace obyvatel se svým regionem. Z tohoto důvodu byl fenomén podroben analýze. Analýza prokázala silnější podobu fenoménu v regionu s nepřerušenou kontinuitou socio-historického vývoje. Zjištěný poznatek přispívá k potvrzení důležitosti procesu dlouhodobého formování regionů.

Key words: *regional identity of inhabitants, socio-historical development, continuity, Jeseník region, Valašské Klobouky region, Czech Republic*

1. Introduction

The identification of inhabitants with their region is a concept that can be understood as one of the essential principles of the regional identity of a population. Seen from a broader perspective, it is also an essential dimension of the phenomenon of regional identity (Paasi, 1986). The specific form of the concept that is presented here is variable and depends undoubtedly on many aspects. These aspects include the characteristics of a regions' inhabitants, which can represent regional typology criteria. The core of the present paper is therefore the issue of the identification of people with their regions, which are typologically different, as shown below.

Although intense research efforts have been devoted to the connection and identification of communities with their regions and can be observed at theoretical and empirical levels in world geography since the 1980s (Knight, 1982; Paasi, 1986; Pred, 1984), in Czech geography, these efforts involve only a narrow circle of scholars, such as Chromý (2003), Chromý, Skála (2010), Nikischer (2013), Siwek and Kaňok (2000), Siwek and Bogdová (2007) and Vencálek (1998). The present article can thus be seen as a contribution to a more detailed understanding of the concept under review, with attention paid to specific and typologically different regions of the Czech Republic.

The specific objective of the paper is to assess to what extent the current level of a population's identification with their region differs in regions with a different continuity of socio-historical development. The situation where inhabitants of a particular region identify strongly with their region must be understood as the outcome of a long-evolving process that has its origins in the past. The current form of the identification

of a community with its region is deeply conditioned by historical development in general, but also by the specific historical development of the region (Graham, 2000).

In the course of Czech history in the 20th century, we can trace events that determined to a great extent the regional typology discussed in this paper. As indicated above, we refer to the classification of regions into two groups: those with a discontinuity of socio-historical development, and those in which the interruption of this continuity did not occur. The fundamental processes are those that one could see immediately after the Second World War: the post-war transfer of the German population, whether in the form of so-called 'wild expulsion' or displacement under the terms of the Potsdam Agreement (cf. Čapka, Slezák, Vaculík, 2005). This transfer is related directly to large-scale migration processes: the inhabitation of empty territories which arose due to the transfer.

In both cases, the above-mentioned processes resulted in an overall population exchange in a number of regions, concentrated predominantly in border areas (Daněk, 1993). Chromý (2003) aptly refers to these territories as regions with a lost identity. The Jeseník region is one of them. Since its population was almost completely replaced in the post-war period, it can be seen as a region of discontinuity in terms of its socio-historical development. Not all border areas of today's Czech Republic, however, were forced to undergo such an extensive transformation of their populations. In those with a minor share of the German population, this transformation occurred only partially as emigration of local residents to a greater or lesser extent connected with the above-mentioned settlement processes. The identification relationships that developed over the long term between local communities and

their regions have not been disturbed by interventions from outside. The Valašské Klobouky region is a typical example of such a region where no post-war population change took place, and we can therefore speak of it as of a region with an uninterrupted continuity of socio-historical development. There are a number of practical limitations in performing an extensive and logistically demanding research study that would cover all or at least most of the border regions, so only the two above-mentioned regions were selected for the purposes of this paper.

The research questions formulated in order to reflect the set of objectives are as follows:

a. in the case of the regions in question, how intense is the degree of identification of local people with their region?;

b. is the comparison of the degree of a population's identification with their region in the studied regions characterised as conformity, or rather as difference?; and

c. is the degree of a population's identification with their region affected by the basic socio-demographic profiles of the populations in the studied regions?

In the following sections of this paper, the theoretical and methodological bases of primary issues to be examined are presented, followed by a characterisation of the regions of interest and the research methods applied to find answers to the above research questions. Then we will present the results from the field surveys and their interpretation. Finally, some essential conclusions will be discussed.

2. Theoretical and methodological starting points

The scientific interest in places, the importance that people attach to them and the interest in how people identify themselves with place, have a long tradition. Vávra (2010) sees the philosophical basis of the study of places as early as in the works of Husserl and Heidegger. Heidegger (2008) introduced the concept of the spatiality of being, which was later transferred into geography by humanistic geographers. For example, Tuan (1974) argued that if a person names a part of a space and identifies with it, this part of space becomes a place. People naturally identify with some places more strongly than with other ones, and therefore they attach more importance to them. These subjective attitudes are mainly produced by the perceptions of the place and by the experiences of people in this place. For this principle of subjective attachment to the importance of meaning, he uses the term sense of place.

Places are also an important source of identity for individuals. Relph (1976) suggests that identity is conditioned by places on two levels. First, there is an *identity of place*, understood as a lasting stability and unity of a place that enables the place to be distinguished from others. The identity of place is determined by three components: physical setting, activities and meaning. Relph argues that of these three components, meaning is probably more difficult to grasp than the others, yet it is of vital importance. Secondly, there is *identity with place*. The essence of the concept is the degree of interconnection, consistency and involvement of people with the place.

At this point, it is desirable to conceptualise the spatial categories of place and region, and to indicate some differences between them. At first glance, this problem may appear to be a mere quibble; however, to understand the content of the following sections such a conceptualisation is necessary. It seems crucial that 'scale' or 'territory size' of the categories place and region is not as important as the number of people who are associated with them. If a place is understood as an individual category, then the category of region is seen as a collective category (Paasi, 1986). Place is therefore a spatial entity, in which stages of human life take place. In the event of the death of a person, this place can cease to exist. Naturally, people do not live in isolated spaces and they share a number of places. In this case, when people live at a certain place and share similar experiences, everyday practices or some reproduced historical consciousness in connection with it, it is appropriate to use the term region. A region can also be seen as an entity that mediates the interaction of people with the institutional sphere. Thus, unlike identification with a place, regional identity, of which a key part is the sense of belonging and identification, has a collective basis (Zimmerbauer, 2011).

Scientific interest in the above-outlined properties of regions intensified in the 1980s. The main finding in this period is an understanding of regions as processes or social constructs (Knight, 1982; Paasi, 1986). For example, Pred (1984) opposes the concept of regions as clearly delimited and visible entities. He also rejects their static nature and instead he understands a region as *a process whereby the reproduction of social and cultural forms, the formation of biographies, and the transformation of nature ceaselessly become one another, at the same time that time-space specific path-project intersections and power relations continuously become one another* (Pred, 1984: 292).

The identification of a population with their living space can be understood as one of the key aspects of socially constructed regions (Chromý et al., 2011). It is a long-lasting process in which the identity of individual people is created; therefore, Graham (2000) emphasised the importance of the area's socio-historical development. In this sense, the evolutionary continuity of a society is very important. If the continuity of regional communities is preserved, the continuity of the perception of living space and the continuity of the relationship of belonging are usually maintained, too. These processes usually help to establish favourable conditions for future generations and permanent reproduction of the process of the identification of people with their milieu.

When we see a break in the continuity of regional communities, however, it is evident that in the subsequent development of the region the character of these conditions will be different. Thus, we can assume a difference in the character of the process of people's identification with their milieu. The act of discontinuity itself can be seen in two forms, which differ in their dynamics. In the first case there is a relatively short-term process caused mainly by external factors. A prime example is the post-war development of the borderland regions in the Czech Republic, which were formerly inhabited mostly by the German population. In the second case, there is a long-term process, which can affect several generations, and can be seen as a result of both internal and external factors. A good example is the long-term trend of emigration, which in its extreme form can result in an actual interruption of continuity.

It has already been mentioned that the identities of individual persons are influenced strongly by spatial factors: individuals perceive themselves as members of the local community on a kind of exclusive basis. As stated by Kučerová-Kuldová (2008), a necessary condition for developing awareness of belonging to a particular area is a long-term stay in it. Long-term residence of individuals

in the area and permanent residence as a specific form of this, are linked with the permanent perception of stimuli that shape identification with the region. Not only the length of their stay in the territory, but also other qualitative characteristics by which people can be divided into sub-groups (or structures), may affect the principles of developing an identification of residents with their region. Here we have in mind mainly their age, which to some extent corresponds with the previous quality of length of stay, and the level of their educational background; differences between men and women may also play a role.

Breakwell (1992) offered an evaluation of some of the principles by which people use places and regions to create their own identity. He presented the following hierarchically arranged principles:

a. distinctiveness: the principle of distinguishing a person from others based on the place where he/she lives;

b. continuity: the principle consists of the awareness of life continuity of a person living in one place on a long-term basis;

c. the principle of self-esteem: a person has a feeling of respect for the place where he/she lives; and

d. the principle of self-efficacy: by virtue of its character, a place can make human life easier in many aspects.

The phenomenon of the interconnection or identification of residents with the region, through which the residents attribute a role to the region in the hierarchy of regional consciousness, can be considered an essential subset of the regional identity of a region's inhabitants (Paasi, 2002), which is, according to Paasi (1986), also formed (secondly) by the idea of community, which may be either ideal or factual. The third formative subset of a population's regional identity is the image of the region. For completeness, it is essential to add that communities living outside the region also actively participate in the creation of the nature of this subset. In summary, it can be stated that the identification of a population with a region is an essential and organic part of a broader concept of regional identity. This phenomenon has another important feature in relation to the competitiveness of regions (Paasi, 2013), their further development and continuous reproduction, which is attested to by Chromý and Janů (2003), Paasi (2003), Raagmaa (2001, 2002) and Zimmerbauer and Paasi (2013).

As indicated by Hidalgo and Hernandez (2001), a variety of approaches can be found on both theoretical and methodological levels. There is no uniformly used name for the phenomenon; it is possible to find similar terms such as community attachment, sense of community, place attachment, place identity, place dependence, or sense of place. In empirical terms, there are also different approaches to particular problems of measuring the population's identification with a region. On the one hand, one hears opinions based on the humanistic tradition in geography claiming that identification with the region is a very abstract concept and an appreciation of how it is formed, develops and disappears is a complex task. When trying to accomplish it, it is appropriate to use a rather subjective and "softer" approach. The measurement of the phenomenon is then unnecessary (Lewis, 1979). On the other hand, there are researchers (Shamai, 1991; Shamai, Kellerman, 1985; Shamai, Ilatov, 2005) who are influenced by positivist approaches and who try to measure and consequently categorise the levels of process of identification with the region. This paper lies somewhere in between these two

approaches. Being aware of the fact that not everything can be measured precisely and following the evaluation of the above-mentioned principles offered by Breakwell (1992), an attempt is made to outline the present form of the concerned issue through the example of two case study regions.

3. The case study regions

Both of the previously-mentioned areas of interest have many identical or at least similar features. In particular, they are both rural areas (for a detailed typology of rural areas cf. Perlín, Kučerová, Kučera (2010)). According to a group of partial theories of regional development based on the core-periphery model, our areas of interest are, as mentioned earlier, peripheral areas (Mikšátová, 2005; Vaishar, Zapletalová, 2005). This finding is also supported by empirical investigation, especially by Musil and Müller (2008). The effects of peripherality are strongly influenced by another common feature of both studied areas, which is their border location (Jeřábek, Dokoupil, Havlíček et al., 2004). For the region of Valašské Klobouky, Vaishar and Zapletalová (2005) even use the term marginalised area, as they see this region, together with the Jeseník region, as problematic zones.

Location is then a strong influence on the phenomena that are clearly observable in the two areas, such as, inter alia, high unemployment, long-term negative net migration, a low educational structure of the population, or poor transport services. On the other hand, the regions differ structurally in terms of religiosity, which is significantly higher in the Valašské Klobouky region. Furthermore, we can find different patterns of voting behaviour, different ethnic relationships before 1945 – see Tab. 1 – and primarily the above-mentioned different trends of post-war development. According to Chromý's (2003:172) typology of regions based on regional consciousness, the two study areas would be ranked in different categories. While the Jeseník region – as stated above – is a region of lost identity (border area displaced after the Second World War, which lost its standard-bearers, i.e. autochthonous inhabitants), the Valašské Klobouky region, as a southern part of the traditional cultural and historic region of Wallachia, may be classified as a region of traditional regional consciousness. The post-war development thus caused the regions in question to show different regional milieu with different conditions for the formation of the regional identity of local inhabitants. The Jeseník region can be typologically assigned to the category of regions whose continuity of the socio-historical development was interrupted, while the Valašské Klobouky region can be typologically assigned to the category of regions whose continuity of socio-historical development was uninterrupted.

The Jeseník region and the Valašské Klobouky region can be perceived as spatially inexact, with boundaries of a slightly fuzzy character, which may have several reasons. First, the historical and administrative development of the areas, which resulted in changes in the administrative delimitation of these areas, should be mentioned. Further, the process of the subjective attribution of these regions' spatial extent by local residents, whose individual delimitations often vary, should be considered. In this context, the two regions under examination can be seen as a result of social construction. This is a concept, which is directly related to the points at issue and therefore it is dealt with in this paper.

Any exclusive spatial definition for the Jeseník region and the Valašské Klobouky region is hence denied here, and therefore, for the purposes of this paper, the author used the

current administrative zoning that existed at the time of field surveys organised in 2009 (Jeseník region) and 2011 (Valašské Klobouky region). Therefore, the Valašské Klobouky region was de facto identified with the administrative district of the municipality with extended competence (MEC) of Valašské Klobouky, and similarly the Jeseník region was defined as an administrative district of the Jeseník MEC. The two regions under study, in the form in which they were defined for the purposes of our paper, are shown in Figure 1.

4. Research methods

The necessary data used for the purposes of this paper were gathered during two field surveys. The first of them took place in the Jeseník region in May 2009, and this was followed by the second field survey, realised in the

Valašské Klobouky region in the period May-August, 2011. The acquisition of data and information took place using two methods. The main part of the fieldwork used a questionnaire survey, which was then supported by informal questioning of a selected group of respondents beyond the content of the questionnaire. In total, the above method included 696 residents. Out of this, 420 were respondents whose place of residence at the time of the survey was in the territory of the administrative district of the Jeseník MEC. This number equalled 1.02% of the total population (41,318) of the Jeseník region as of July 1, 2009 (CZSO, 2010). The remaining 276 respondents had their place of residence in the territory of the administrative district of the Valašské Klobouky MEC. Proportionally, it was about 1.17% of the population (23,656) of the Valašské Klobouky region as of July 1, 2011 (CZSO, 2012).

1930									
Jeseník region		Czechoslovaks		Germans		Others		Foreigners	
	Total	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)
	71,717	2,703	3.77	66,987	93.4	135	0.19	1,892	2.64
1930									
Valašské Klobouky region		Czechoslovaks		Germans		Others		Foreigners	
	Total	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)	abs.	rel. (%)
	24,341	24,091	99.0	68	0.3	39	0.2	143	0.5
		Total population 1950							
Jeseník region		37,571							
Valašské Klobouky region		32,995							

Tab. 1: Population of the areas under study before and after World War II
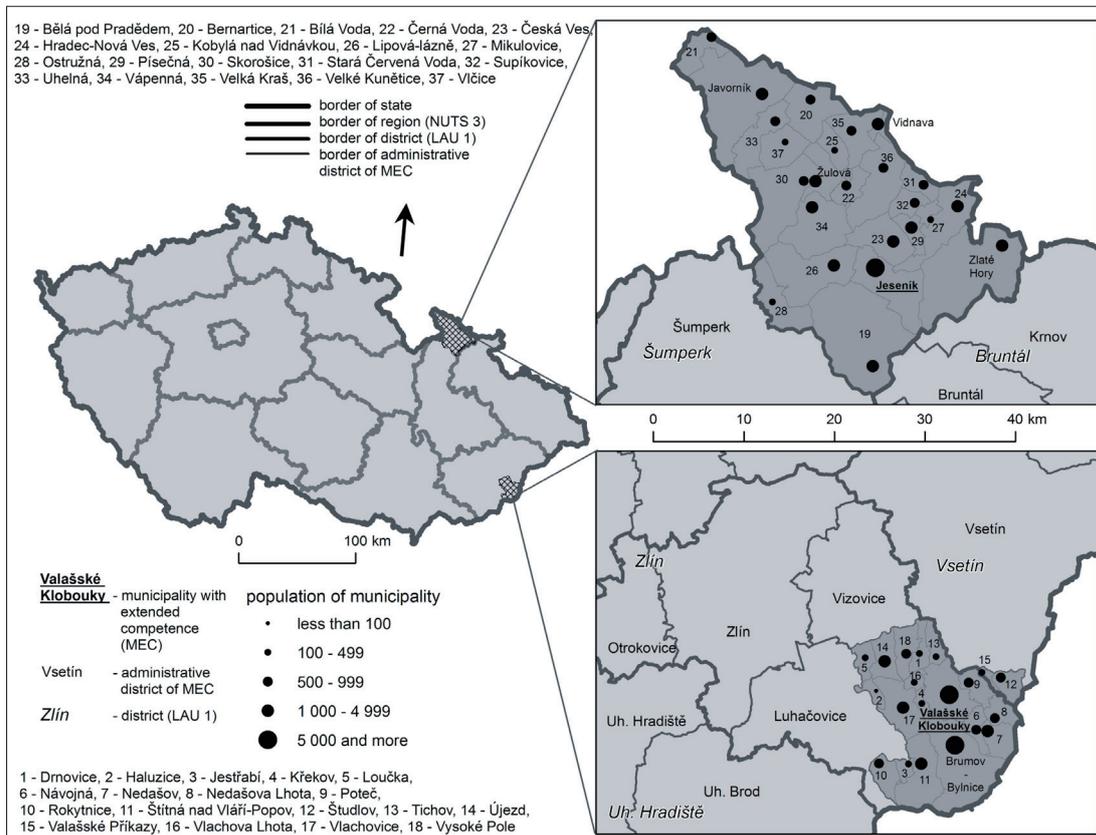Sources: Bartoš, Schulz, Trapl (1982, 1994); CZSO (1951); author's processing

Fig. 1: Areas under study. Sources: ArcČR 500 version 2.0a; author's processing

The interviewed residents were subsequently structured according to four selected categories, which were based on identifiers that constituted a part of the questionnaire. The identifiers generating the final form of the profile were as follows: gender, age, education, and length of residence in a municipality within the area of interest. The resulting structure of interviewed residents is presented in Table 2. The level of compliance (representativeness) of the socio-demographic profile of the population sample that was investigated according to these categories with the identically conditioned profile of populations living in the regions of Jeseník and Valašské Klobouky at the time of the survey, was validated using the χ2 test. The resulting findings are shown in Table 3.

The χ2 test (at a significance level α = 0.05) showed a compliance in the sets of interviewed respondents from the regions of Jeseník and Valašské Klobouky with the total population of these regions by the sub-groups of gender, age, and residence duration. On the other hand, a relatively great discrepancy was found between the educational structures of the two areas, indicated by the computed value significantly exceeding the tabled value of the criterion, especially in the case of the respondents from the Valašské Klobouky region. The main reason for the observed discrepancy may be seen in the exceptionally high proportion of university graduates (11.3% in the Jeseník region, 13.4% in the Valašské Klobouky region) in the groups of interviewed residents. We can say that as to the quantity of respondents and the

Time spent in the area as resident							
Jeseník region				*Valašské Klobouky region*			
Natives	*Greater part of life*	*Lesser part of life*	*Short-lived*	*Natives*	*Greater part of life*	*Lesser part of life*	*Short-lived*
45.5	33.5	14.0	7.0	59.4	27.5	10.9	2.2
Age group							
Jeseník region							
15–24		*25–34*		*35–44*	*45–54*	*55–64*	*65+*
21.6		14.3		16.9	14.6	18.9	13.7
Valašské Klobouky region							
15–24		*25–34*		*35–44*	*45–54*	*55–64*	*65+*
22.1		15.2		17.7	20.0	11.6	13.4
Education							
Jeseník region							
Elementary		*Secondary school without graduation*		*Secondary school with graduation*		*University*	
19.6		37.2		31.9		11.3	
Valašské Klobouky region							
Elementary		*Secondary school without graduation*		*Secondary school with graduation*		*University*	
22.5		35.5		28.6		13.4	
Gender							
Jeseník region				*Valašské Klobouky region*			
Males		*Females*		*Males*		*Females*	
50.8		49.2		44.2		55.8	

Tab. 2: The socio-demographic profile of survey respondents (%)
Sources: field survey; author's processing

	Jeseník region			Valašské Klobouky region		
	Criterion value	Critical value	Structure answers	Criterion value	Critical value	Structure answers
Structure by gender	0.16	χ2 (0.05;1) 3.84	yes	3.67	χ2 (0.05;1) 3.84	yes
Age structure	11.05	χ2 (0.05;5) 11.07	yes	10.82	χ2 (0.05;5) 11.07	yes
Educational structure	32.04	χ2 (0.05;3) 7.81	no	61.43	χ2 (0.05;3) 7.81	no
Structure by birthplace	1.12	χ2 (0.05;1) 3.84	yes	3.36	χ2 (0.05;1) 3.84	yes

Tab. 3: Representativeness of the sample: χ2 test results
Sources: CZSO (2003a, 2003b, 2003c, 2010, 2011); field survey; author's processing

qualitative character of selected sub-groups, the selected population group of respondents constituted a sufficiently representative sample of populations in the regions of Jeseník and Valašské Klobouky, except for the educational structure of the interviewed residents.

Statistical methods (using χ2 tests of association) were also applied for testing hypotheses using the survey data, to identify statistically significant differences in the aggregate and partial structures of the responses between the two studied regions. As a basic set, the author selected the structure of responses from the Jeseník region, with the statistical assumption that the frequency of different types of responses from the respondents in the Valašské Klobouky region would coincide with the frequency of each type of answer of the respondents in the Jeseník region.

5. Analysis of field survey results

The attempt to evaluate the extent of a population's interconnection with their regions in the areas of interest was made by using a set of comprehensible closed questions, which in some cases were supplemented with open-ended sub-questions. Due to the size limitations of this paper, only three of these questions will be analysed. Specific formulations of the questions mentioned below were chosen in order to evaluate the emigration potential and principles (Breakwell, 1992) introduced in Section 2, by which people use places to create their own identity. When trying to reflect the last two of these principles, it was found that the fundamental question relating to the principle of self-esteem is Question 1: *"Do you feel to be a patriot, i.e.: Are you proud of the region in which you live?"*. Table 4 presents responses to this question, with the simple region breakdown.

Table 4 suggests a relatively significant difference between the resulting declarations of respondents in both regions. With 82% of the answers to this question being positive, the respondents from the Valašské Klobouky region showed a significantly higher sense of pride in their region. On the contrary, the respondents from the Jeseník region declared their patriotism in 64% of cases. An essential difference was observed in the partial response "not at all". In the Jeseník

region, there were 76 respondents (18%) choosing this answer, while in the Valašské Klobouky region it was only one respondent (0.36%). The test of a significant difference between the regions (χ2 test: note that all partial results of tests between regions and for sub-groups are integrated in Table 5, below) showed that the responses to this question showed statistically significant differences between the regions, as the critical value was exceeded many times. In this case, the null hypothesis of the compliance of the structures of responses between the studied regions had to be rejected.

In the studied partial socio-demographic categories, the greatest statistical differences were recorded in the responses of natives living in the region. In this category, the author would have expected stronger links with the region, because it is the area where they were born, grew up, stayed to live and hence they are usually very well familiar with it. This was outlined in Section 2, above, and therefore the observed differences seem surprising. The test results show that over 86% of the natives responded positively in the Valašské Klobouky region, while in the Jeseník region, it was only 60% of the natives. The natives of the Jeseník region addressed during the survey may be considered members of the next generation of post-war immigrants, who apparently failed to build a 'proper' sense of pride in their new home. Thus, they could not pass it onto the next generation, for whom the Jeseník region is their place of birth.

Another significant difference (from the χ2 test) was detected in the sub-category of women, while for men nothing like that was evidenced. It is possible to say that the frequency of positive responses from females clearly prevailed in the Valašské Klobouky region again. Local women declared a positive response in more than 83% of cases, while in the Jeseník region it was only some 54% of women. Thus, it seems that women in the Valašské Klobouky region use their region for building their own identity more strongly than women in the Jeseník region.

If we look at the partial categories of respondents defined by their education, we find that the response rates were similar for the categories of inhabitants with basic education and those who had completed secondary education.

Questions	Responses	Valašské Klobouky region	Jeseník region
Question 1: "Do you feel to be a patriot, i.e., are you proud of the region in which you live?"	*Definitely yes*	33.7%	30.0%
	Maybe yes	48.6%	30.9%
	Not really	5.4%	17.2%
	Not at all	0.4%	17.2%
	I do not mind	11.9%	4.7%
Question 2: "Do you think the region you live in can make in some way your life easier as compared with other regions?"	*Definitely yes*	6.9%	6.9%
	Maybe yes	21.7%	9.4%
	Not really	43.2%	35.6%
	Not at all	15.2%	43.8%
	I do not mind	13.0%	4.3%
Question 3: "Have you ever thought about moving to another region?"	*Yes*	26.4%	38.7%
	No	73.6%	61.3%

Tab. 4: Descriptive statistics related to three key questions
Sources: field survey; author's processing

Category	Question 1		Question 2		Question 3	
	critical value: χ2 (0.05; 4) = 9.49		critical value: χ2 (0.05; 4) = 9.49		critical value: χ2 (0.05; 1) = 3.84	
	value of criterion	significant statistical difference	value of criterion	significant statistical difference	value of criterion	significant statistical difference
Total	22.00	yes	30.35	yes	8.32	yes
Males	7.18	no	20.56	yes	3.02	no
Females	17.03	yes	11.66	yes	4.47	yes
Natives	21.25	yes	24.43	yes	1.81	no
Bigger part of life	2.54	no	6.26	no	2.93	no
Lesser part of life	0.77	no	2.93	no	0.92	no
Short-lived	1.33	no	2.00	no	3.63	no
15-24	11.41	yes	11.43	yes	15.20	yes
25-34	4.18	no	5.41	no	5.52	yes
35-44	3.65	no	4.52	no	1.12	no
45-54	7.78	no	6.64	no	0.28	no
55-64	3.67	no	5.42	no	0.03	no
65+	0.73	no	1.23	no	0.18	no
Elementary	5.10	no	4.68	no	0.49	no
Secondary school without graduation	12.22	yes	10.76	yes	7.19	yes
Secondary school with graduation	3.53	no	12.13	yes	0.96	no
University	12.40	yes	4.78	no	3.29	no

Tab. 5: Results of testing for statistically significant differences between the partial socio-demographic categories of the case study regions. Sources: field survey, author's processing

Statistically significant differences were demonstrated in inhabitants with secondary education and university education. In both cases, a higher frequency of positive responses was found in the Valašské Klobouky region, and a higher frequency of negative responses in the Jeseník region. In the inhabitants with secondary education, the observed difference probably comes from their high representation in the total set of respondents in each of the regions; see Table 2. As to university students, whose representation was much lower, this result is rather surprising, as one might assume that the long-term effects of the educational system on this sub-group would have a positive impact on the positive expression of regional patriotism in both cases. The reason for this assumption is the importance of the education system during the formation of a population's regional identity (Chromý, 2003). This importance lies in the possibility of reproducing this phenomenon and contributing to the production of its strong form. With some caution, it is possible to say that this process was more efficiently applied for the university-educated respondents in the Valašské Klobouky region.

Results of testing within age groups suggest that only the youngest age category exhibited a statistically significant difference. The reason may be the higher frequency of negative responses to the question from respondents of this age group in the Jeseník region. The fact that more than 42% of the respondents answered negatively is not 'good news' for the Jeseník region, as this age group should mediate feelings of pride in the region, or, in a broader sense, the regional identity of local inhabitants in the future. In this context, young people in the Valašské Klobouky region (6% negative responses) represent a far greater potential for the future direction of their region.

Some interesting findings stemmed from comments which interviewees used to justify their answers. In the case of respondents from the Jeseník region, comments were given by 82% of residents who responded to the question positively, while only about a half (43%) of the respondents tried to justify their negative response. Similar ratios were observed in the Valašské Klobouky region: 85% of respondents justified their positive answers, while only 37% of respondents presented arguments for their negative attitudes. Perhaps we are seeing a pattern where people can more easily formulate positive aspects that they perceive within their region.

An attempt was made to classify the seemingly wide range of responses (when answering an open-ended question, respondents could provide a variety of reasons) within aggregating categories, whose definitions were not significantly different between the surveyed regions. Most people justified their positive responses by their long-term residence in the region, which they defined as their home and the area where their families live. The second most frequent category was physical-geographical and environmental conditions, aesthetic quality of the landscape, or, more precisely, the positive perception of these. The third most frequent type of responses demonstrated a certain emotional link with their region. Instead of tangible reasons that respondents were not able to express, they used emotionally-tinged formulations such as a "matter of the heart" or "I like it here". Another source of pride proved to be positive identification with the local community. In the Jeseník region, the respondents characterised local inhabitants by using adjectives such as "kind, honest, hardworking" or as people who are "happy to help". In the Valašské Klobouky region, the respondents highlighted such

properties as stability, independence, cordiality, and, very often, religiousness. Some respondents declared as a source of pride in the region, the local culture and traditions, or their overall satisfaction with the region.

As for the justification of negative responses, the respondents in both regions mostly complained of the lack of job opportunities and the related need to commute to work, high unemployment, and low living standards caused by financial problems. In both regions, the dissatisfaction with inadequate wage levels was obvious. The second largest share of responses then reflected poor infrastructure, transport services, and the low level of service facilities. In the Jeseník region, 24% of the respondents showed an overall dissatisfaction with the region, calling it a "backwoods" or "sleepy hollow" or "a region with nothing to be proud of". In the Valašské Klobouky region, a much smaller share (8%) of people responded in this way; they mostly agreed that "there is no reason to be proud of anything". In the Jeseník region, there was an apparent aversion to the local inhabitants, who were labelled as "bad, strange, hypocritical, ignorant, or stupid", and negative descriptions of the local Roma community were quite frequent ("because there are too many Gypsies here"). In the Valašské Klobouky region, this justification was less frequent; the local community was criticised mainly for its enviousness, alcoholism, ignorance, and inclination to crime (thievery).

In order to map the principle of self-efficacy, which was introduced in section 2, the respondents were asked Question 2: *"Do you think the region you live in can make in some way your life easier as compared with other regions?"*. The basic structure of their responses is shown in Tab. 4. At first sight, it is evident that the share of positive responses, in both areas of interest, was much lower than in the previous question and some significant statistical differences can be seen, for example the high value of the resulting criteria in Table 5, in the structure of responses. While in the Valašské Klobouky region, 29% of responses were positive, in the Jeseník region the share was only 16%. An interesting contradiction stems from the composition of the negative responses. In the Valašské Klobouky region, 43% of the respondents believe that their region does not make their lives easier when compared with other regions. In the Jeseník region, an almost identical percentage of respondents (44%) declared the opinion that their region, in comparison with other regions, does not make their lives easier at all.

As with the previous question, statistical structures of responses differed most for the regions' natives and the reasons were very similar. Natives in the Valašské Klobouky region identified themselves with the principle of self-efficacy (almost 30%) more than natives in the Jeseník region (almost 17%), where a higher relative frequency of negative responses to this question was logically observed. Partial results indicated again a greater bond of the key social category with their region in the Valašské Klobouky region.

In addition to women, statistically significant differences were also shown in the responses of men this time. The main reason was a far higher relative frequency of "not at all" responses of respondents from the Jeseník region, both males and females.

The sub-categories determined by the level of education showed significant statistical differences in respondents with some secondary or complete secondary education. Here again, the author believes that the significant

difference resulted from the majority representation of both categories in the total set of respondents. For the sake of correctness, let us add that the investigated principle of self-efficacy reflected more in respondents with secondary education from the Valašské Klobouky region. In people with basic education, it was found that the proportion of positive answers was the highest in both regions as compared with the other educational categories. The author assumes that these findings do not necessarily imply their closer connection with the region. More probably, it is a result of the low level of education and the related low level of awareness of other regions. By contrast, university graduates in both regions hardly agreed with the thesis that their region, with its specific characteristics, makes their life easier. This may be due to their education, which provided them with a higher level of knowledge and a better background in terms of information, rather than the low level of their identification with the region.

As for the individual age groups, statistically significant differences were identified in the youngest age category only. In the group of respondents between 15 and 24 years of age in the Valašské Klobouky region, nearly 36% assumed that their region is of a better quality, while in the Jeseník region it was less than 25%. In both cases, however, in our opinion, the values were low and the regional decision makers should therefore target their activities at building a regional image, which could strengthen the principle of self-efficacy in this crucial social category.

Positive responses in the Valašské Klobouky region were justified in 43% of cases, while in the Jeseník region, where people defined the reasons for their answers more easily, they were justified in 66% of cases. In both regions, the answers were most often explained using a perception of the environmental quality of the region, in particular minimum air pollution, healthy living environment, cleanliness of the country, or the feeling of residents' closeness to the countryside. The second most frequent justification was the same again: presence of family and friends in the region, or good knowledge of the local environment. In the Valašské Klobouky region, the respondents often reported reasons stemming from the local community, to which 14% of respondents who answered positively attributed a kind of cohesion and the following properties: hospitality, diligence, honesty, openness, independence, kindness, and pride. In the Jeseník region, nobody mentioned these generalising qualitative properties or any other ones. In the Valašské Klobouky region, people also emphasised some religious and cultural aspects (trust, respect for traditions, and the resulting easier upbringing of children). The economy of the regions (quantitatively and qualitatively adequate job opportunities, wealth of the region, and its positive development) were identified in both regions as aspects which determine the formation of the principle of self-efficacy to the smallest extent.

In Table 4, we can identify the main results of answers to question 3: *"Have you ever thought about moving to another region?"*. This question was chosen deliberately in order to map the tendency of residents to emigrate. The relation between continuous emigration and the interruption of socio-historical development has already been outlined in the theoretical part of this paper. Concerning regional identity, the potential emigration of inhabitants is crucial in several respects (see Raagmaa, 2001). First, it may be caused by the weak regional identity of local residents (exacerbated by inadequate fulfilment of their economic needs), and on

the other hand it may also cause weak regional identity. Through emigration, the region loses its standard-bearers, who can later establish links to other places or regions, and the original source region of migration is then converted into an area of memories or recreation (Zich, 2003). In the worst case, the links to the original region die away completely. Peripheral regions, including the two case study areas, have to face such emigration trends as a result of a population's moving to central locations in consequence of the post-totalitarian and post-industrial transformation (Chromý, Skála, 2010).

Application of the χ2 test showed a statistically significant difference again. It is obvious that the idea of leaving the region comes more often to the minds of respondents from the Jeseník region. Almost two-fifths (39%) of them gave positive answers to this question, while in the Valašské Klobouky region it was only about a quarter (26%) of the respondents. The evaluated sub-categories showed statistically significant differences in the responses of women, for whom the tendency to migrate was higher in the Jeseník region. A similar situation was found in respondents from the 15–24 and 25–34 age groups. In general, the likelihood of young people emigrating is again more pronounced in the Jeseník region.

According to the results of the χ2 test, the structure of motives for potential emigration did not show any statistically significant differences. In both regions, the primary cause of a possible move was the labour market. In other words, to find or change to a job outside the region in question is clearly the strongest motive, as shown in Table 6. The motive of relationships is much less frequent. In the Jeseník region, a larger part of the respondents who were considering a move declared an overall dissatisfaction with their place of residence or their region, while in the Valašské Klobouky region, this motive was found only marginally.

The resulting structures of potential target areas for emigration did not show statistically significant differences and were easy to interpret. In both cases, the lack of ambition

to migrate to another municipality in the region can be explained by poor job opportunities, which the respondents perceived very well. Therefore, in both regions, the answer "elsewhere in the Olomouc (or) Zlín region" dominated, where 'region' in these cases was the new Administrative Region (AR): see Figure 2. This is attributable to the fact that, first, the respondents in the case study areas have a good general knowledge of the area of these administrative units. Additionally, it is desirable to talk about a relatively strong identification of inhabitants in the studied areas with the Olomouc AR and the Zlín AR, which was demonstrated during our investigation. Although these spatial entities were only institutionalised in their current form in 2000, it seems that because of the purposefully constructed image of the Olomouc region and Zlín region through the creation of symbols, an effective influence of local media, and visibility of regional institutions and awareness building through the educational system, these new self-governing Administrative Regions have successfully rooted
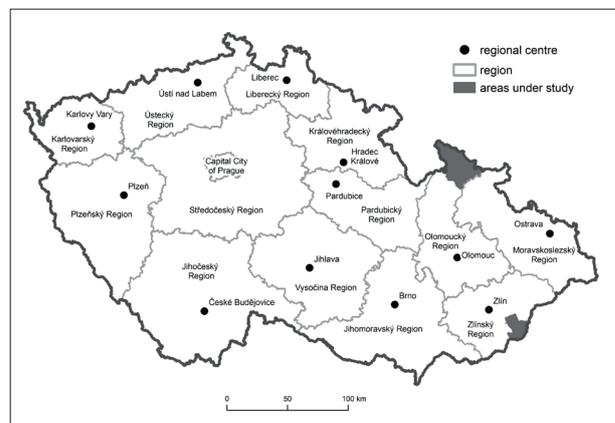

Fig. 2: Administrative regions of the Czech Republic
Sources: ArcČR 500 version 2.0a; author's processing
Note: The Region of Central Bohemia has its administrative centre situated in Prague

Valašské Klobouky region				Jeseník region				critical value: χ2 (0.05; 3) = 7.82	
reason of potential moving from the region (%)									
relationship	employment	general dissatisfaction with the place/region	other reasons	relationship	employment	general dissatisfaction with the place/region	other reasons	value of criterion	significant statistical difference
26.03	64.38	2.74	6.85	6.74	75.28	10.11	7.87	3.99	no
the destination of potential emigration (%)									
elsewhere in the studied area	elsewhere in the administrative region	outside the administrative region	outside the Czech Republic	elsewhere in the studied area	elsewhere in the administrative region	outside the administrative region	outside the Czech Republic	value of criterion	significant statistical difference
15.07	45.21	30.14	9.59	4.49	52.81	37.08	5.62	1.71	no

Tab. 6: Residents susceptible to emigration: their reasons and potential destinations
Sources: field survey, author's processing

themselves in the minds of local inhabitants. Among various target destinations, the regional centres (Olomouc and Zlín) predominated, while former district cities (Šumperk and Vsetín) were mentioned less frequently. Naming these cities can be understood as a result of respondents' perceptions of the concentration of job opportunities.

In both regions, about one third of the respondents considered the possibility "outside the Olomouc/Zlín region", where the prominent cities played a key role again. The most frequently mentioned city in both regions was Brno, which most probably reflected personal experiences (studies, previous employment) of the respondents. In the Jeseník region, the factor of personal experience played a relatively strong role in the case of Ostrava and also Opava, while in the Valašské Klobouky region, Olomouc is followed again, though to a lesser extent, by Ostrava (see Table 6).

6. Conclusions

The aim of this paper was to evaluate whether the contemporary level of the identification of inhabitants with their region differs in typologically different regions in which the socio-historical continuity of development was different. We selected two areas of interest (case study regions) that correspond with this regional typology: the Jeseník region (resettled area with an interrupted continuity) and the Valašské Klobouky region (area that was not resettled and with an uninterrupted continuity). In order to reflect the set objectives, we formulated three research questions: first, how intense is the degree of identification of local people with their case study region; second, whether a comparison of the level of identification with their region for these case study regions, may be characterised as conformity or rather as difference; and third, whether the phenomenon of the degree of the identification of inhabitants with their region is affected by the basic socio-demographic profile of the population in these regions.

Answers to these questions were sought by analysing three factors, namely the principle of self-esteem, the principle of self-efficacy and the tendency to emigrate. The required data sets were obtained through surveying residents in the study regions and then analysed using $\chi2$ tests of association. The analysis showed differences in the intensity of the level of identification between the two regions: a higher level of identification of the population with their region was demonstrated for the Valašské Klobouky region, as both the principles that were rated (self-esteem, self-efficacy) were markedly apparent in the Valašské Klobouky region, while in the Jeseník region a greater tendency to emigrate was found. It is also reasonable to assume that the comparison of the phenomena under evaluation between the two regions has the character of difference rather than conformity. In the case of responses relating to the principle of self-esteem, the principle of self-efficacy and the tendency to emigrate, statistically significant differences between the two regions were demonstrated. In terms of particular socio-demographic sub-groups, we found statistically significant differences that count 'against' the Jeseník region between the responses of women (compared to men), as well as for other key social categories – especially natives and the younger age groups.

Based on these findings, it is possible to attribute a higher degree of regional identity to the inhabitants of the Valašské Klobouky region than for the population of the Jeseník region. It seems, therefore, that as compared with the Jeseník region, we identified conditions more

favourable for a further shaping of regional identity and higher levels of partial endogenous development potential in the Valašské Klobouky region.

Although the conclusions of this paper correspond with other findings (Chromý, Kučerová, Kučera, 2009; Jančák, Chromý, Marada, Havlíček, Vondráčková, 2010; Kuldová, 2005) demonstrating the differentiation of the Czech population's regional identity as a dichotomy between resettled and not-resettled territories, it is probable that no generalisation of the above-mentioned findings is possible at the moment. Although these findings reflect the importance of historically contingent processes for the development of the socially constructed population's regional identities, the author maintains that a formulation of general conclusions would have to be supported by a survey in other regions reflecting the afore-mentioned dichotomy.

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MORAVIAN GEOGRAPHICAL REPORTS

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Fig. 5: Mountain meadows above Podkonice village with some overgrowing areas (Photo: M. Druga)

Fig. 11: Podkonice village viewed from mountain meadows above it (Photo: M. Druga)

Illustrations related to the paper by M. Druga nad V. Falťan