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ARTICLES

Nicola Francesco DOTTI*, Bas VAN HEUR*, Colin C. WILLIAMS**

MAPPING THE SHADOW ECONOMY: SPATIAL VARIATIONS IN THE USE OF HIGH DENOMINATION BANK NOTES IN BRUSSELS

Abstract. The aim of this paper is to map the spatial variations in the size of the shadow economy within Brussels. Reporting data provided by the National Bank of Belgium on the deposit of high denomination banknotes across bank branches in the 19 municipalities of the Brussels-Capital Region, the finding is that the shadow economy is concentrated in wealthier populations and not in deprived or immigrant communities. The outcome is a call to transcend the association of the shadow economy with marginalized groups and the wider adoption of this indirect method when measuring spatial variations in the shadow economy.

Key words: informal economy, undeclared work, cash deposits, Brussels.

1. INTRODUCTION

Is the shadow economy concentrated in marginalized areas and populations, such as in immigrant populations, and as a result, reduces the spatial disparities produced by the formal economy? Or is it concentrated in more affluent populations and, as a consequence, reinforces the disparities produced by the formal economy? This paper seeks answers to these questions. For many

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decades, intra-national variations in the size of the shadow economy have been studied using survey methods using interviews with respondents in different locality-types (e.g., Kesteloot and Meert, 1999; Williams, 2004). This is in stark contrast to the study of cross-national variations where indirect measurement methods using proxy indicators have been widely used for many decades (Buehn and Schneider, 2012; GHK and Fondazione Brodolini, 2009). Indeed, no studies have so far employed indirect methods to evaluate the intra-national variations in the size of the shadow economy. This paper therefore fills that gap. The aim is to employ an indirect measurement method, namely the use of high denomination bank notes approach, to analyse intra-national variations in the size of the shadow economy.

To do this, the first section will briefly review the findings of direct survey methods regarding intra-national variations in the size of the shadow economy and review the range of alternative measurement methods potentially available with a particular focus on the high denomination banknotes approach. Identifying that no studies have so far evaluated intra-national variations in the size of the shadow economy using indirect measurement methods, the second section then fills this gap by setting out the methods and data used to evaluate the local variations in the use of large denomination bank notes (over €50) in the 19 municipalities of the Brussels-Capital Region (BCR) in 2010. The third section then reports the results by analysing the deposit of large denomination bank notes across bank branches in the 19 municipalities of Brussels and how this is correlated with the level of affluence and presence of immigrant populations. The fourth section then draws some conclusions and calls for the wider use of this indirect measurement method when mapping intra-national variations in the size of the shadow economy.

Before commencing, however, the shadow economy needs to be defined. Ever since Hart (1973) first introduced the concept of the ‘informal sector’ in his study of Ghana 40 years ago, what is here termed the shadow economy has been defined in terms of what is absent from or insufficient about it relative to the legitimate economy (Williams and Lansky, 2013) and the most widely accepted definition is that these paid activities are not declared to the public authorities for either tax, social security and/or labour law purposes (European Commission, 2007a, b, 2014; OECD, 2002, 2012; Williams, 2004; Williams and Windebank, 1994, 1995). The prominent way they are hidden is by using cash since unlike bank transfers, cash transactions cannot be tracked by the fiscal or statistical authorities and given that larger banknotes (€100, €200 and €500) are not commonly available from ATMs, so must be deliberately acquired, there is strong suggestion that their use is symptomatic of shadow economy transactions.

2. BEYOND SURVEYS OF THE SHADOW ECONOMY: A REVIEW OF ALTERNATIVE METHODS

Until now, studies of local variations in the size of the shadow economy have used direct surveys of populations in contrasting localities. The result is that current understandings of the intra-national variations in the size of the shadow economy are premised entirely on this one measurement method. Reviewing the findings, these studies have tended to refute the ‘marginalization thesis’ which asserts that the shadow economy is concentrated amongst marginalized populations such as low-income populations and immigrant communities, who disproportionately participate in and gain from this realm (Ahmad, 2008; Castree *et al.*, 2004; Gutmann, 1978; Katungi *et al.*, 2006).

Instead, the finding of the vast majority of locality studies is that the marginalized benefit less from the shadow economy and that the shadow economy reinforces, rather than reduces, the inequalities produced by the legitimate economy (i.e., the reinforcement thesis). Direct surveys have displayed this not only in western and southern European nations (Barthe, 1985; Mingione and Morlicchio, 1993; Van Geuns *et al.*, 1987; Williams, 2004) but also in Central and Eastern European countries (e.g., Meriküll and Staehr, 2010; Onoshchenko and Williams, 2013; Pavlovskaya 2004; Williams *et al.*, 2013). This finding regarding the local variations in the shadow economy, however, is premised on just one measurement method and also a method which has been shown to have a bias towards identifying small-scale odd-jobs undertaken in the shadow economy and under-reporting larger-scale shadow transactions (Ram and Williams, 2008).

When analysing cross-national variations in the size of the shadow economy however, a much wider array of measurement methods have been used. Besides direct surveys (e.g., European Commission, 2007b), a range of indirect measurement methods using various proxy indicators have been employed. These indirect methods can be divided into three broad types; those using non-monetary indicators, monetary proxy indicators and income/expenditure discrepancies. The most common non-monetary methods are those firstly, seeking traces in formal labour force statistics (e.g., Flaming *et al.*, 2005; Hellberger and Schwarze, 1986), secondly, using very small enterprises as a proxy (e.g., ILO, 2002) and third and finally, using electricity demand as a surrogate (e.g., Friedman *et al.*, 2000). Three principal monetary proxies, similarly, have been used, namely large denomination notes (Bartlett, 1998; Carter, 1984; Freud, 1979; Henry, 1976; Matthews, 1982), cash deposits (Gutmann, 1977, 1978; Tanzi, 1980) and money transactions (Feige, 2012) and more recently, a MIMIC (multiple indicators, multiple causes) approach (e.g., Schneider, 2005; Schneider and Williams, 2013). Third, and finally, income/expenditure discrepancies have been analyzed both at the aggregate national and household level (Paglin, 1994).

On the whole, these indirect measurement methods produce higher estimates of the size of the shadow economy than direct survey methods (Buehn and Schneider, 2012; GHK and Fondazione Brodolini, 2009; Ram and Williams, 2008). Although there is of course no way of knowing whether the higher estimates produced by these indirect measurement methods are indeed more accurate than the lower estimates of direct surveys (Fortin *et al.*, 1996; Pestieau, 1985; Kesteloot and Meert, 1999; Williams, 2004; Williams *et al.*, 2013), a strong consensus has emerged across the practitioner and academic communities that indirect measurement methods are the most appropriate method for measuring the variations in the size of the shadow economy and that survey methods should be confined to analysing its characteristics such as who does it and why they do it (European Commission, 1998, 2007b; OECD, 2012; Ram and Williams, 2008; Williams, 2013).

In this paper, we follow this consensus by using an indirect method for studying local variations in the size of the shadow economy. Until now, although indirect measurement methods are the norm when evaluating the cross-national variations in the size of the shadow economy, they have not been used when evaluating the intra-national variations. This paper fills that gap. To do so, the intention is to use the monetary method that examines the use of high denomination notes as a proxy indicator to evaluate how the size of the shadow economy varies across localities. Until now, this approach has been only used when making estimates at the national scale of the size of the shadow economy (Bartlett, 1998; Carter, 1984; Freud, 1979; Henry, 1976; Matthews, 1982).

Here, however, and for the first time, it is used to measure the local variations in the size of the shadow economy. Indeed, such an approach represents a useful counterweight to direct surveys. This is because direct survey methods, due to the social desirability bias of responses, tend to pick up a wide array of shadow economy transactions for relatively small amounts of money (e.g. Cornuel and Duriez, 1985; Evason and Woods, 1995; Williams, 2004) such as when people engage in baby-sitting for their neighbours or do small odd-jobs for family and friends, but fewer large transactions. This high denomination notes technique, however, captures primarily larger-scale shadow transactions. For example, 1 in 20 formal employees in the European Union receive both a declared wage from their formal employer and an additional undeclared ('envelope') wage and this envelope wage paid in cash amounts on average to two fifths of their wage packet (Williams, 2009a, b; Williams and Padmore, 2013a, b). It is likely that the study of the deposit of high denomination bank notes will pick up some of this envelope wage work. It is also likely to identify more of the wholly undeclared full-time waged employment and also wholly undeclared self-employment where a small business conducts work on a cash-in-hand basis, as well as illegal activities such as the proceeds of crime.

Akin to all measurement methods of the size of the shadow economy, therefore, this method provides a better trace of some types of shadow economic activity

but not others. The advantage of this large banknotes method is that it enables larger transactions in the shadow economy to be traced rather than smaller-scale activities such as odd-jobs and one-off paid favours for relatives, neighbours and friends. This provides a useful counterweight to the conventional direct survey. As such, it will be interesting to explore whether the findings regarding local variations are similar to those identified by the direct survey method.

3. EXAMINING LOCAL VARIATIONS IN THE USE OF HIGH DENOMINATION BANK NOTES: METHOD AND DATA

To analyze the local variations in the use of large denomination notes as a proxy measure of the size of the shadow economy, we here report a data set made available by the National Bank of Belgium (NBB). This records all cash deposits, including what size of banknote was deposited from €5 up to €500, in all branches of private banks at the level of postal codes in 2010. We extracted all the postal codes corresponding to the 19 municipalities of the BCR, summing different postal codes within the same municipality (i.e. the Brussels-City Municipality includes postal codes 1000, 1020 and 1120) and excluding those referred to EU institutions (e.g. codes 1047, 1048 and 1049) or other specific cases (e.g. codes 1043 and 1044 refer to national public broadcasting channels). Here, this data is aggregated to the level of the 19 municipalities so as to enable comparison with other municipal-level socio-economic data in order to evaluate the validity of the marginalization thesis using this alternative measurement method. This socio-economic data on household income and the presence of immigrant populations at the municipal level is sourced from the statistical institute of the BCR (BISA/IBSA).

To analyze the localities in which large banknotes are disproportionately over- or under-used, we here employ the ‘location quotient’ (LQ) method. The LQ of X is calculated as a share of a certain indicator (i) on the total municipal value (p) weighted by the same ratio at the Brussels city region level (n):

Equation 1

$$Q_L = \frac{\frac{x_{i,p}}{x_{i,n}}}{\frac{x_{.,p}}{x_{.,n}}} .$$

This then makes it possible to identify the municipalities in which the deposit of large banknotes is higher or lower, using the BCR as the reference level for the municipal variations. The interpretation of the LQ is straightforward. Values above

1 mean that there is a greater preponderance to deposit high denomination bank notes, whilst a value below 1 indicates a lower than average preponderance. In this paper, when LQ values are between 0.90 and 1.10, we assert that no difference to the norm is detected.

In Belgium similarly to the rest of the Euro zone, banknotes above €50 are hardly ever used in everyday transactions and banknotes of €100, €200 and €500 are rarely even available and even more seldom used, although their tender is absolutely legal and by definition associated with higher value transactions, which would normally be conducted using a credit and debit card so far as most legitimate transactions are concerned. Indeed, there is an advantage to the consumer of using a debit or credit card since they can be blocked and money refunded. However, the transactions can be tracked by the authorities and cannot be hidden. These aspects do not apply when cash payments are involved, and one of the only advantages of using cash payments is that the transaction can be more easily hidden from the authorities. It is to be expected, therefore, that a large proportion of the deposits of high denomination banknotes will be the proceeds of shadow activities.

4. EVALUATING LOCAL VARIATIONS IN THE USE OF HIGH DENOMINATION BANK NOTES IN THE BRUSSELS-CAPITAL REGION: FINDINGS

Direct surveys, with their bias towards small-scale one-off shadow transactions, and as shown above, have refuted the marginalization thesis by revealing the size of the shadow economy is larger in relatively affluent localities. To analyze whether a similar relationship is found using this alternative method, with its bias towards larger-scale shadow economy transactions, we here first construct a ‘wealth index’ which evaluates the relative wealth of each locality within Brussels by examining the average household income, as calculated by the BISA/IBSA, weighted by the household income for the Brussels city region as a whole, so as to show whether a locality is above or below the average household income for the BCR.

As figure 1 displays, the spatial distribution of wealth in BCR involves a central axes (the Canal Zone and surrounding municipalities) which is poorer, and two richer sides on the North-West and on the South-East of Brussels. Examining how the deposit of high denomination bank notes of €100 and over is distributed, the finding is that in more affluent municipalities (mainly in South-East municipalities), the deposit of large banknotes is up to three times higher than in poorer municipalities (the Canal Zone). This is similarly the case in the more affluent North-West sector, although the situation there is less marked. The clear implication, therefore, is that the shadow economy is larger in more affluent localities, thus refuting the marginalization thesis.

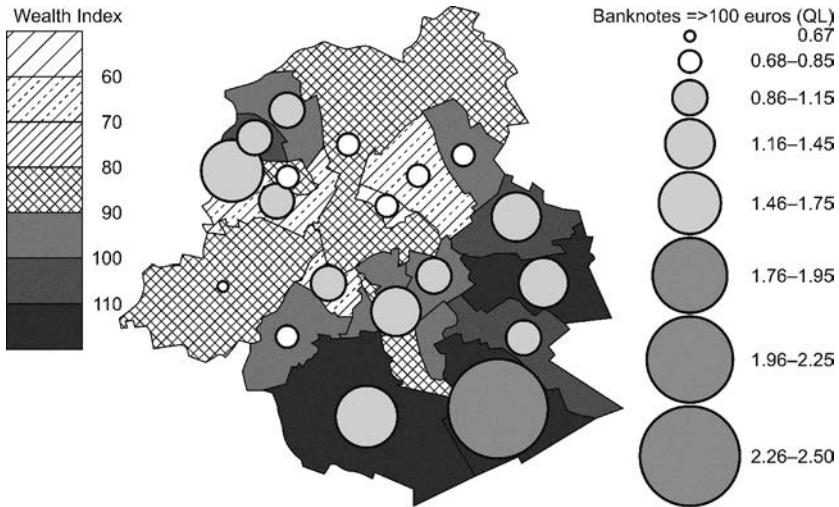


Fig. 1. Local variations in the use of high denomination bank notes in BCR:
by the level of affluence of municipalities
Source: authors' elaboration

Indeed, this refutation of the marginalization thesis remains valid when a finer-grained analysis is undertaken of the deposit of all denomination values of large banknotes. Figure 2 provides a graphic representation of the usage of all the

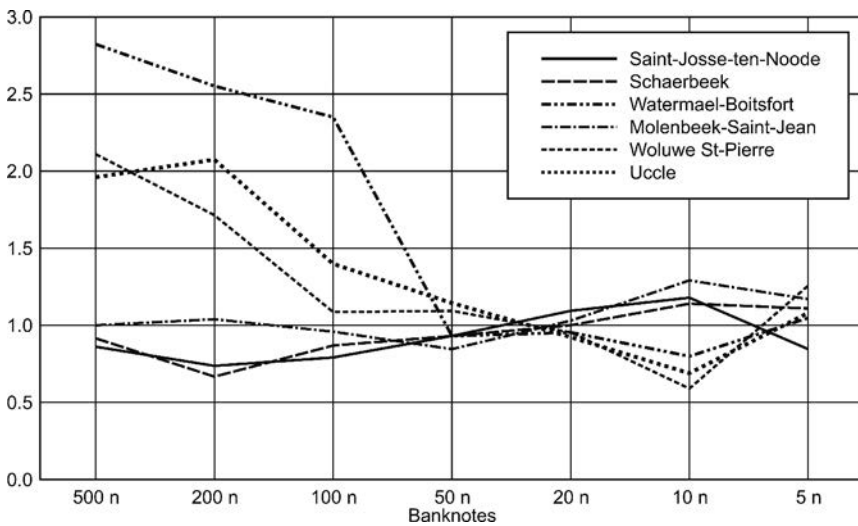


Fig. 2. Use of different denomination banknotes in the most affluent
and deprived municipalities of Brussels
Source: authors' elaboration

possible banknotes in circulation (€5, €10, €20, €50, €100, €200, and €500) in two locality-types, namely the three richest municipalities in Brussels (Woluve-Saint-Pierre, Watermael-Boitsfort and Uccle) and the three poorest ones (Saint-Josse-ten-Noode, Molenbeek-Saint-Jean, and Schaerbeek). The finding is that in three relatively affluent localities, the use of banknotes above or equal €100 is much higher than in three poorest ones but that there are no significant differences in the use of €20 and €50 banknotes. The use of smaller banknotes (€5 and €10), however, is slightly higher in poorer municipalities, perhaps reflecting the flight of financial institutions from poorer populations and thus the financial exclusion of their populations (Leyshon and Thrift, 1995), making them more dependent on the use of cash rather than debit or credit cards when engaging in transactions.

It is not only when household income is analyzed that the marginalization thesis is refuted and the reinforcement thesis is validated. This is also the case when the relationship between the marginalization in the form of immigrant populations and the use of large banknotes is analyzed. This is the case for both immigrants as a whole as well as when a more nuanced analysis of different immigrant populations is analyzed.

Figure 3 provides a graphic representation of whether municipalities with large immigrant populations have a tendency to deposit large banknotes to a greater extent than municipalities with lower immigrant populations. The finding is that there is no clear relationship between municipalities with large immigrant populations and municipalities in which large banknotes are deposited to a greater

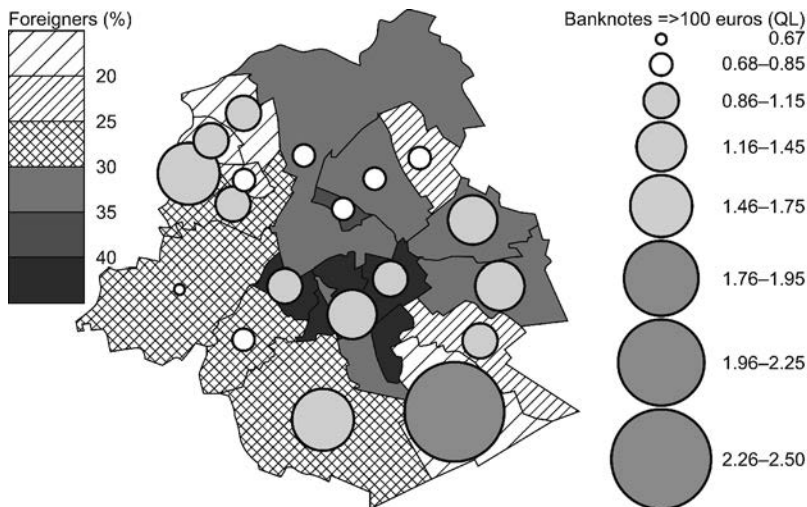


Fig. 3. Relationship between spatial distribution of immigrant population and the shadow economy in BCR

Source: authors' elaboration

extent. Indeed, quite the opposite is the case. Analysing this, the first important point to note is that in Brussels, the proportion of the population that is non-Belgian is relatively high, ranging between 20% and 30% in most municipalities. However, there are concentrations. Firstly, there is a major concentration in Ixelles and Etterbeek, where European Commission institutions are located, as well as in Saint-Gilles, where there is a mix of various immigrant population groups. In these municipalities, the deposit of large denomination bank notes is lower than average. Secondly, the municipalities in the north-west and south-east which have a lower percentage of immigrants, mainly related to higher house prices determining a 'qualitative' selection in favour of few richer immigrants, witness relatively higher deposits of large banknotes. And third and finally, the southern municipalities where there are universities, but relatively smaller immigrant populations, although some are not always registered in official statistics, have slightly higher deposits of large banknotes. On the whole, nevertheless, the finding is that there is no evidence that the deposit of large denomination bank notes in bank branches is concentrated in municipalities with high immigrant populations. Rather, it appears that the deposit of large banknotes is generally smaller in municipalities with large immigrant populations.

Does this refutation of the marginalization thesis hold, however, when these immigrant populations are broken down into different sub-groups possessing different cultural and socio-economic characteristics? To evaluate this, we break down immigrant populations into different sub-groups by their country of origin. This is important in the context of Brussels because the presence of European Commission institutions has resulted in an immigrant population that includes a relatively higher proportion of higher income and educated immigrants than in other European cities.

Starting with immigrant populations from Africa, mainly represented by Moroccans that are about 60% of the African community in the BCR, figure 4 reveals a clear concentration of this immigrant group in the central Canal-zone where the use of large banknotes is much lower. Indeed, there is a clear overall relationship between the municipalities where Africans are concentrated and the use of large banknotes. The deposit of larger banknotes is relatively low in all municipalities where African immigrants are concentrated, thus refuting the marginalization thesis and validating the reinforcement thesis.

It is similarly the case when the immigrant populations from Latin America are analyzed. Figure 5 displays a clear concentration of this immigrant group but again in municipalities where the use of large banknotes is much lower. Indeed, there is a clear overall relationship between the municipalities where Latin Americans are concentrated and the use of large banknotes. The deposit of larger banknotes is highest in the municipalities where Latin American immigrants are lowest, thus refuting the marginalization thesis and validating the reinforcement thesis.

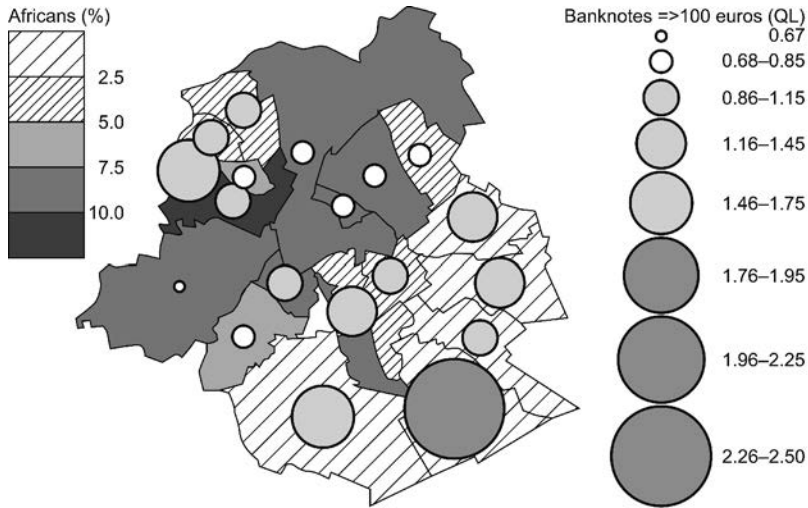


Fig. 4. Relationship between spatial distribution of African immigrants and the shadow economy in BCR
Source: authors' elaboration

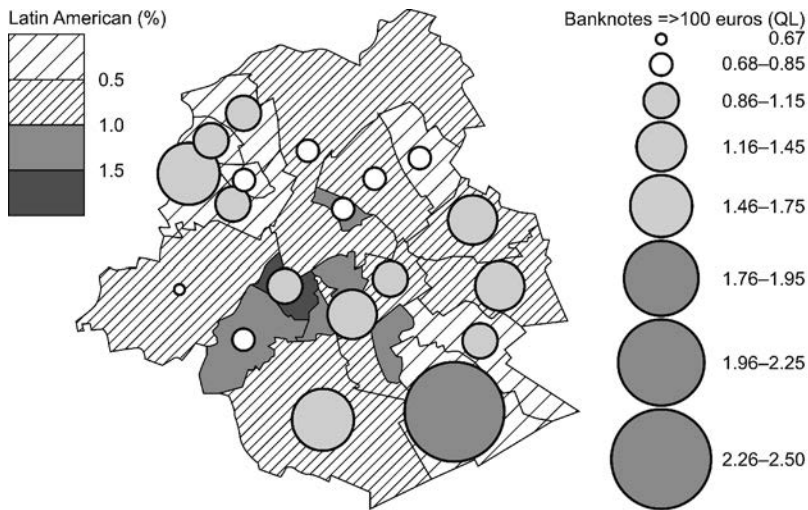


Fig. 5. Relationship between spatial distribution of Latin-American immigrants and the shadow economy in BCR
Source: authors' elaboration

Turning to an analysis of European immigrant populations, we here distinguish four groups for analysis:

- Southern Europeans: Greeks, Italians, Portuguese and Spanish;
- Central and Eastern Europeans: Bulgarians, Cypriots, Czech, Estonians, Hungarians, Latvians, Lithuanians, Maltese, Polish, Rumanians, Slovaks, and Slovenians;
- Northern Europeans: Austrians, British, Danish, Dutch, French, Finnish, Germans, Irish, Luxembourgers, and Swedish;
- Non-EU Europeans: Albanians, Macedonians, Montenegrins, Russians, Serbians, and Turks.

Starting with Southern European immigrants, these four immigrant populations of Greeks, Italians, Portuguese and Spanish are relatively established immigrant populations in Brussels, especially the Italians and Portuguese. As figure 6 reveals, these Southern European immigrants are concentrated in the municipalities from Anderlecht to Woluwe-St.-Pierre with a different geography to other immigrant populations. Nevertheless, the concentration of southern Europeans is clearly independent of the spatial patterns in the use of large banknotes. Again, therefore, there is no validation of the marginalization thesis.

Examining Eastern and Central European Union migrants, which include all countries that joined the European Union after 2004, a different distribution is apparent. This immigrant group is concentrated in municipalities in which the use of large denomination bank notes is lower (see figure 7). Northern

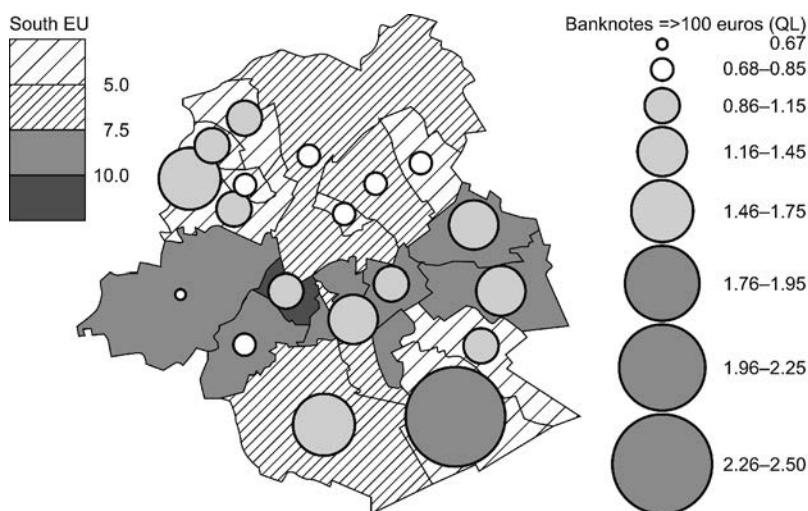


Fig. 6. Relationship between spatial distribution of Southern European immigrants and the shadow economy in BCR

Source: authors' elaboration

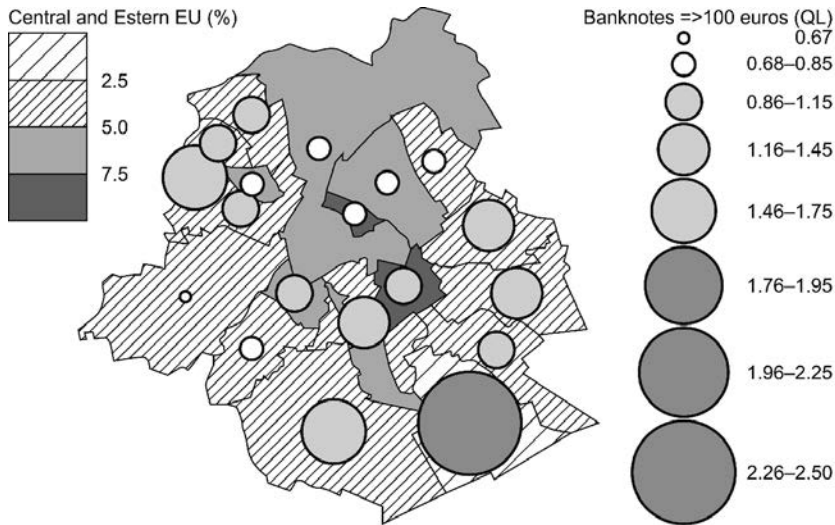


Fig. 7. Relationship between spatial distribution of Central and Eastern European immigrants and the shadow economy in BCR
Source: authors' elaboration

European migrant populations, meanwhile, is basically a label that includes all the EU nationals not included in the other two categories, although the label 'Northern' might sound inappropriate for countries like Austria and France. As figure 8 displays, these migrant populations are concentrated in central and south-eastern municipalities with a spatial distribution which is symmetric to African migrants. Again, however, the distribution of Northern Europeans does not match with the use of large banknotes. And finally, the non-EU European migrant population, which includes mainly Russians and Turks in Brussels, has a spatial distribution relatively similar to Southern Europeans (see figure 9). Again, therefore, there is no correlation between the spatial distribution of non-EU Europeans and the municipalities in which the deposit of high denomination bank notes is higher.

In sum, this analysis of different migrant communities has shown that the use of larger banknotes is not clustered in areas where they tend to be concentrated. Although migrant populations are clustered in particular municipalities, as is the deposit of large denomination bank notes clustered in specific municipalities, these clusters do not match each other. Therefore, the assumption of the marginalization thesis that the shadow economy is concentrated in poor areas where immigrants are concentrated cannot be confirmed. Instead, quite the opposite is the case. The use of large banknotes is more common where immigrations are not concentrated.

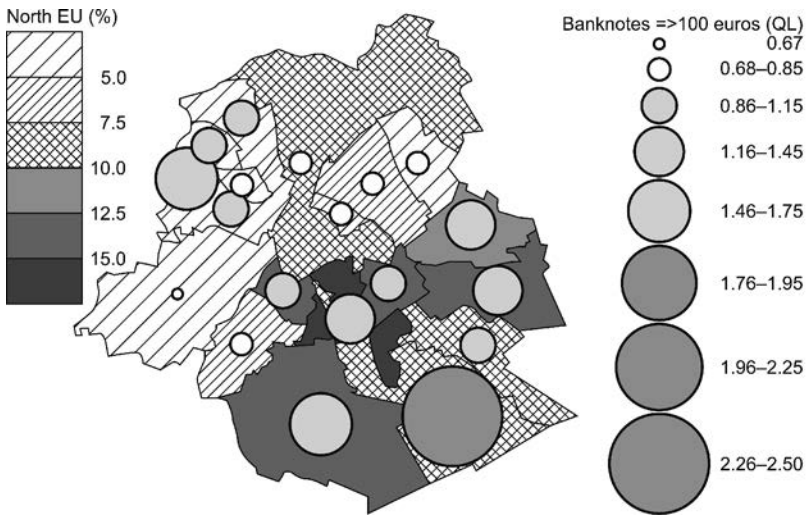


Fig. 8. Relationship between spatial distribution of Northern EU immigrants and the shadow economy in BCR
 Source: authors' elaboration

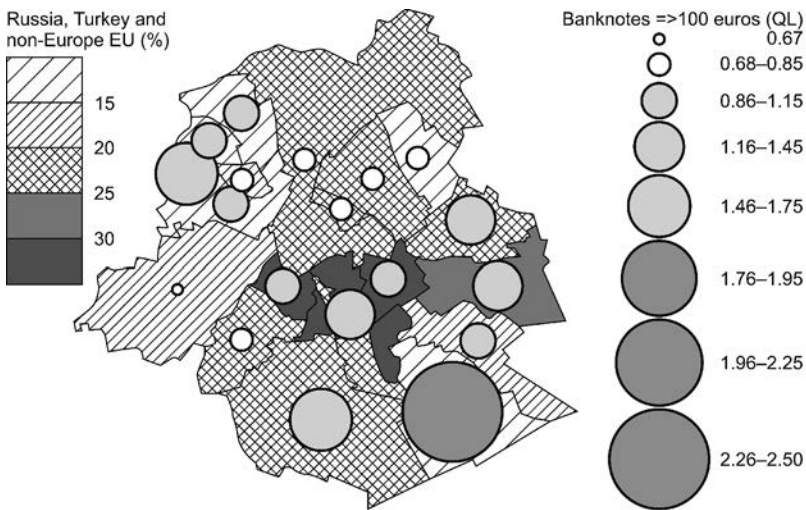


Fig. 9. Relationship between spatial distribution of non-EU European immigrants and the shadow economy in BCR
 Source: authors' elaboration

5. CONCLUSIONS

This paper has for the first time evaluated the local variations in the size of the shadow economy by mapping the deposit of large denomination banknotes in bank branches on a spatial level. The logic is that given the rise of debit and credit cards, and the greater safety of using them to engage in transactions, and how large denomination banknotes are not available from ATMs and must be specifically acquired, the use of such large denomination banknotes can be taken as a proxy indicator of the desire of people to hide their transactions from the authorities for tax and social security purposes. To do this, the findings of a dataset of the National Bank of Belgium is analyzed which provides detail of the level of deposit of large denomination banknotes across bank branches in all 19 municipalities of the Brussels city region.

Until now, studies of the local variations in the size of the shadow economy have reported the findings of direct surveys, which tend to focus upon small-scale shadow activities and to under-report large-scale transactions due to the social desirability bias of small-scale transactions which tend to be paid favours conducted to help out close social relations and viewed as less fraudulent than larger-scale transactions (Williams, 2004). The finding is that the shadow economy is not concentrated in marginal populations (i.e., the marginalization thesis) but rather is concentrated in more affluent populations (i.e., the reinforcement thesis). In this paper, we have evaluated whether similar findings apply when this indirect method is used which focuses more upon larger-scale transactions. The finding is that this is indeed the case. The size of the shadow economy is larger, as measured by the deposit of large denomination bank notes in bank branches, in the more affluent municipalities of the BCR and also in municipalities where the proportion of the population that are migrants is lower. Put another way, the findings of this indirect method complement the findings of the direct survey method, showing that it is the reinforcement thesis rather than the marginalization thesis that is valid so far as the local variations in the shadow economy are concerned in the BCR.

In sum, this paper has revealed that studies of the local variations in the shadow economy do not need to rely solely on direct surveys. Indirect methods, which until now have been applied exclusively to the study of cross-national variations, can also be used to study local variations in the shadow economy. Indeed, they represent a useful complement to the direct survey method. If this paper thus encourages more research using indirect measurement methods when mapping intra-national variations in the size of the shadow economy, then it will have achieved its objective.

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**SIGNIFICANCE OF TRANS-EUROPEAN TRANSPORT
NETWORKS FOR LOGISTICS CENTRE LOCALIZATION
AS EXEMPLIFIED BY THE ŁÓDŹ REGION**

Abstract. This work complements and structures knowledge in the field of logistics centres (with focus on the Łódź region). It presents a thorough analysis of strategic documents of the European Union in reference to the functioning of international transport networks. It also provides a detailed description of logistics facilities operations from the theoretical standpoint and definition of relations in points where logistics centres and TEN-T networks overlap. The result of this work is a set of recommendations referring to effective development of logistics centres on the background of transport corridors.

Key words: logistics centres, tran-European transport network, Łódź region.

1. INTRODUCTION

As shown by the historical example of both Europe and the whole world, the course of routes, or transport corridors, to a large extent determined prosperity or stagnation of many civilizations (Tyszkiewicz, 2003). In economic, political and military history road networks play a crucial role, which naturally results from development of settlements and major forms of economic activity, such as trade, transport or industry, along main roads. Initially, transport development took place along river trails and it was only much later that it largely moved to railway lines and then motorways.

The Trans-European Transport Network Executive Agency (TEN-T EA) included aviation apart from the three above-mentioned modes of transport in its project of establishing the single European transport area. The aims, priorities and main plan directions referred to in the Decision of the European

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Parliament and of the Council as of 23rd July 1996 and subsequently in the White Paper, generally focus on increasing the effectiveness, territorial cohesion and compatibility of individual transport systems with special emphasis on the rail network and up-to-date systems of transport infrastructure management. They also stress the importance of transport hubs where individual transport systems may be integrated. Such functional and spatial structures are represented by logistics centres, in particular the multimodal ones. Besides integration of transport systems aimed at increasing the effectiveness of the flow of materials, in practice logistics centres are also a form of integrating many services in one place, taking over part of operations performed by parent companies – customers.

The aim of this work is to analyze the relations which exist where logistics centres and the EU international transport policy meet. In order to achieve this, the work focuses on the localization of logistics centres and intermodal terminals, their characteristics and spatial coverage as well as the course of the Trans-European Transport Network (TEN-T). Furthermore, the above-mentioned analyses are illustrated by the case of the Łódź region situated in the middle of Poland on the intersection of main transport routes with two TEN-T network transport corridors running through its territory and developing logistic clusters (figure 1).

The importance of transport policy is evidenced by the fact that the Nordic countries, including the Barents Region, have vast natural resources, which are attractive to the EU area (critical raw materials for the EU) because of the short and secure supply routes and high reliability and stability of the Scandinavian partners. They may significantly increase the self-sufficiency of raw materials in Europe, which is one of the priorities of the EU. Europe is the largest importer of raw materials and transporting them often from remote locations is costly and raises the price of industrial products, thereby reducing their competitiveness. The longer the route of delivery, the greater the consumption of more expensive fuels and stronger the impact of transport on the environment – mainly by emissions. Given these barriers, it is natural to develop transport corridors providing access to raw materials. It is strategically important in the context of the freight transport system in northern Scandinavia, which includes the Gulf of Bothnia with numerous seaports in Sweden and Finland. It can be extended in all geographical directions, but the greatest development potential is in the southern direction – including the continuation of the Baltic-Adriatic corridor. It is necessary to coordinate the development of infrastructure connecting the ports with the proximal and distal economic environment with investment activities of the management of ports, because they represent a complex relationship between different geographic markets. Traditionally, the logistics process intensification zone developed at the back of the port, as a result of the limited capabilities of the physical transfer of goods to and from the various regions of the world. As a result of more and more

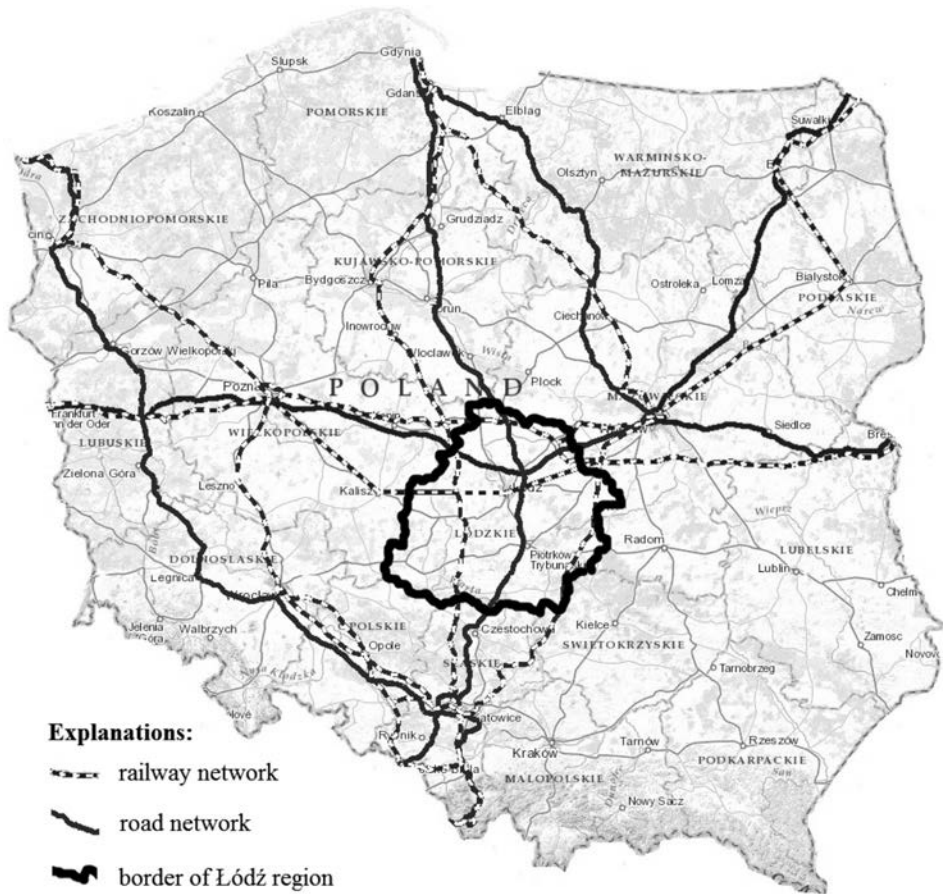


Fig. 1. Localization of the Łódź region against the background of international transport corridors
 Source: author's elaboration on the basis of data made available by the General Directorate for National Roads and Motorways (GDDKiA) and TENtec Information System

efficient land transport infrastructure, the physical distance is no longer the only factor in the location of logistics infrastructure. Today, a port's hinterland can be defined as an area that can be reached at lower cost or in a shorter time than from other ports (Wilmsmeier *et al.*, 2011). The main aim of this article is to examine the location of logistics centres with particular emphasis on the European transport policy. A detailed analysis was carried out on the example of the Łódź region in 2014. The first part of this work presents the operation of logistics centres both generally and in reference to the Łódź region, with a detailed description of key determinants of their location, in the context of the transport policy of the European Union. Such a diagnosis made it possible to propose universal guidelines for the process of localization of logistics centres.

2. LOCALIZATION OF LOGISTICS CENTRES: THEORETICAL BACKGROUND

As an inherent element of the contemporary world logistics concentrates on the management of movement of goods and/or persons together with activities supporting these processes, both in the functional and cognitive aspect (Fechner, 2006). They are numerous and they are very diverse. They may be material (e.g. delivery dispatch), informational (e.g. delivery scanning) or financial (e.g. bank transfers). The beginnings of logistics are difficult to trace back. Movement of goods, i.e. practical operations being the subject of interest for logistics, has existed since trade began to develop. The difficulty consists then not so much in determining when logistics appeared but from which moment it started to be distinguished as a separate activity. Scientists localise this moment in different periods and places. The term 'logistics' in the meaning close to the contemporary definition was first used in the mid-19th century by French general Henri de Jomini, who defined in this way the activity consisting in transport, accommodation and procurement for military troops. Modern logistics can be traced back to the late 1940s and early 1950s. It first began to develop in North America, and above all in the United States. It was not until much later that it appeared in Europe and on other continents. Logistics developed step-like and was shaped within a number of phases. Due to dynamic development of logistics networks the last (present) phase of development of logistics is referred to as logistics networks or e-logistics.

Logistics centres have the most extensive structure of all facilities comprising the logistics network. They are composed of many facilities collaborating with each other and co-operating logistics operators (economic entities involved in logistics operations) (Gołębska, 2012). In logistics literature there are many logistics centre definitions which are based on attempts to classify their functionality (e.g. logistics and distribution centre, logistics centre of distribution) or are a result of marketing strategies of companies which use the logistics centre name for a warehouse of finished goods or central warehouse. Following Fechner (2010), the logistics centre¹ should refer to a spatial facility

¹ 'This is a designated area within which all operations connected with transport, logistics and distribution of goods are performed by different operators as part of deliveries, both on the national and international level. These operators may be owners of built and situated in the centre: buildings, offices, warehouses, storage yards, parking places, facilities, etc. or use them pursuant to leasing or rental agreements. In order to respect the principles of free competition, the centre must ensure access to all companies involved in activities described above. The logistics centre must be equipped with devices and facilities available to the general public allowing to provide services. Whenever possible it should also ensure public services for the staff and users' equipment. In order to support the development of inter-modal technologies in cargo relocation, the logistics centre should be supported by many branches of transport. It is also necessary that the centre be run by an entity appointed especially for this purpose from the public or private sphere' (Europlatforms – Europejski Związek Centrów Logistycznych).

with characteristic organization infrastructure which enables companies to conduct operations on goods in connection with warehousing and relocating them between the sender and the recipient, including servicing inter-modal shipments and performing activities on resources used to this end. This last property distinguishes logistics centres from warehousing centres. Due to the subject matter of this work, it is also important to define the inter-modal handling terminal which, as the facilities described above, allows different manipulation activities to be performed thanks to appropriate infrastructure. The inter-modal terminal, however, concentrates on handling inter-modal transport units in the form of containers, swap bodies and semi-trailers among different means of transport.

Logistics centres are classified in a number of ways depending on numerous criteria. Considering the operation of facilities in the trans-European transport networks it seems of key importance to account for the division according to the number of transport branches (inter-modal, mono transport) on the basis of which the centre develops and the radius in which the logistics centre provides its services (international, regional, local, branch-specific, centres of logistics services) (Mindur, 2012).

Smooth functioning of the supply chain therefore requires modern infrastructure. The future of freight transport is not only modern vehicles and infrastructure, it is mainly efficient logistics systems interconnected and ensuring the implementation of complete logistics chains. In accordance with definitions found in the literature, intermodal transshipment terminal is a spatial object with the proper organization and infrastructure capacity of intermodal transport units: containers, swap bodies and semi-trailers belonging to different modes of transport and operations on these units in relation to their storage and use. Siding is defined as a way station which is connected to the railway line and is used for loading and unloading of wagons, performing maintenance operations on rail vehicles, stationing rail vehicles and directing the movement of rail vehicles into the railway traffic. Siding also includes railway traffic control devices and other equipment related to the safety of rail traffic, which are located on it. Railport is a broader concept. It refers to both these features and also provides comprehensive services related to the functioning of many supply chains. Railports are entities of strategic importance to the economies of many countries. Their functioning is affected by many components such as proximity of industry, other logistics centres or the impact of economic factors and local transport development strategy of the country.

There are certain general criteria of logistics centre localization which are common to all models of implementation of this investment type. They comprise, above all, the structure of the region's economy by type, the volume of the exchange of goods with other regions and in exports and imports, cargo structure by type, kind, condition and availability of transport infrastructure, availability of land, its legal status and purchase price, the size of the market and its potential, levels

of competition on the market of logistics services, environmental and landscape restrictions, and possibilities of adopting alternative functions on the part of the analyzed area (Fechner, 2006).

From the whole variety of determinants it is necessary to choose, however, one key feature in relation to which others are of secondary importance. Therefore, the significance of the course of transport trails must be stressed as *sine qua non* condition of location of logistics facilities. Other variables may, of course, make the given location more or less attractive, yet without roads, railways or water or air transport the process of localization simply could not take place. The factors mentioned above all condition the course of transport infrastructure which, in turn, determines the centre's location.

General location (macro-spatial) is connected with the choice of a given region and subsequently a place where the logistics centre is to be situated. Hence from the macro-spatial perspective the location of the logistics centre is determined primarily by transport corridors and highly urbanized areas (Skowron-Grabowska, 2010). On the other hand, the detailed location (micro-spatial) concerning the logistics centre investment area comes down to indicating a concrete plot and later elaborating its development plan, including distribution of individual elements of the facility. Relations with other facilities and transport network are also determined. From the micro-spatial perspective the choice of logistics centre location is usually made by entities specializing in this field or entities in charge of the investment. As revealed by business practice, the most important element of micro-spatial location is the purchase of the plot on which the planned logistics centre is going to be built. High prices of land in cities and a deficit of sufficiently large dense territories in urban agglomerations contributed to concentration of centres in suburban areas with convenient connections with road and rail networks (Skowron-Grabowska, 2010).

The task of planning a logistics centre location should be given to institutions having comprehensive knowledge on the topic of locating such facilities nationwide. Determining a location is a result of many elements arising from the state's transport policy, distribution of the existing and planned linear and nodal infrastructure, transport directions, structures and build-up of cargo lines (Mindur, 2012). Configuration of logistics centres on the country's territory also depends, among other things, on the spatial layout of modal points i.e. where cargo movement is accompanied with lowest costs. This layout is dependent on the condition of transport infrastructure which undoubtedly affects transport costs as well as the area's logistics absorptive power defining its preparation to absorb logistic solutions (Walczak, 2008) and measured by transport and logistics infrastructure, such as warehouses, distribution and logistics, ports etc. (Januszkiewicz, 2008). It is also not irrelevant to consider availability costs of the given market and investment area.

Nonetheless, all the above-mentioned elements must be convergent with the international transport policy created by the European Union which remains superior in relation to them.

The logistics centre belongs to one of the aforementioned modal points of logistics network configuration. Allocation of areas for future logistics centres and ensuring their transport services should be done at the time of creating spatial management plans or development plans at each administrative level. Considering future transport difficulties, it is of great importance to go to lengths to ensure that logistics centres are based on rail transport combined with different means of transport (multimodal and intermodal transport). The ideal location of logistics centres includes areas with points in space where there are intersections of four different modes of transport (by road, rail, sea and air). Taking into consideration the specific transport network of the Łódź region, it is impossible to find such a perfect location. It suffices to seek the best location having in mind systems of roads² and railways³ (Bartosiewicz and Wiśniewski, 2011).

Logistics centres require specific road infrastructure. On the one hand, the infrastructure must be resistant to considerable surface pressures (caused by movement of cars with high on-axis pressure). On the other, however, it must provide a link with expressways and motorways allowing heavy goods vehicles to access the centre. It is also necessary for the infrastructure to be characterized by high capacity due to the supply transport of small and medium tonnage catering for senders and recipients gathered around the centre.

In Poland there is a zone which meets the condition of ideal localization in reference to the network of expressways and motorways (both existing ones and those in the process of planning). It is the most attractive place for investors situated in the region of Łódź, Stryków and Piotrków Trybunalski, forming the so-called golden triangle of logistics (figure 2) (Skowron-Grabowska, 2010).

Once the investment location is decided on the next step consists in its construction. In this process different realization models may be distinguished. They were created thanks to an analysis of operating logistics centres and a synthesis of experiences gathered by consortiums in charge of completion of logistics facilities. The logistics centre model in Polish realities can be depicted in two variants. The first one comprises a virtual logistics centre model while the other one represents a form of concentrated logistics centre built according to the

² Motorways, expressways, local roads of geometric and resistance parameters allowing for transport of containers between the container terminal and the container sending/receiving point as well as local roads of geometric and resistance parameters allowing for deliveries of goods from storage warehouses in logistics centres to recipients.

³ Railway lines of technical parameters allowing for deliveries of goods at the operating speed of 120 km/h, railway sidings of technical parameters allowing for access of block trains from the main railway line to the container terminal.

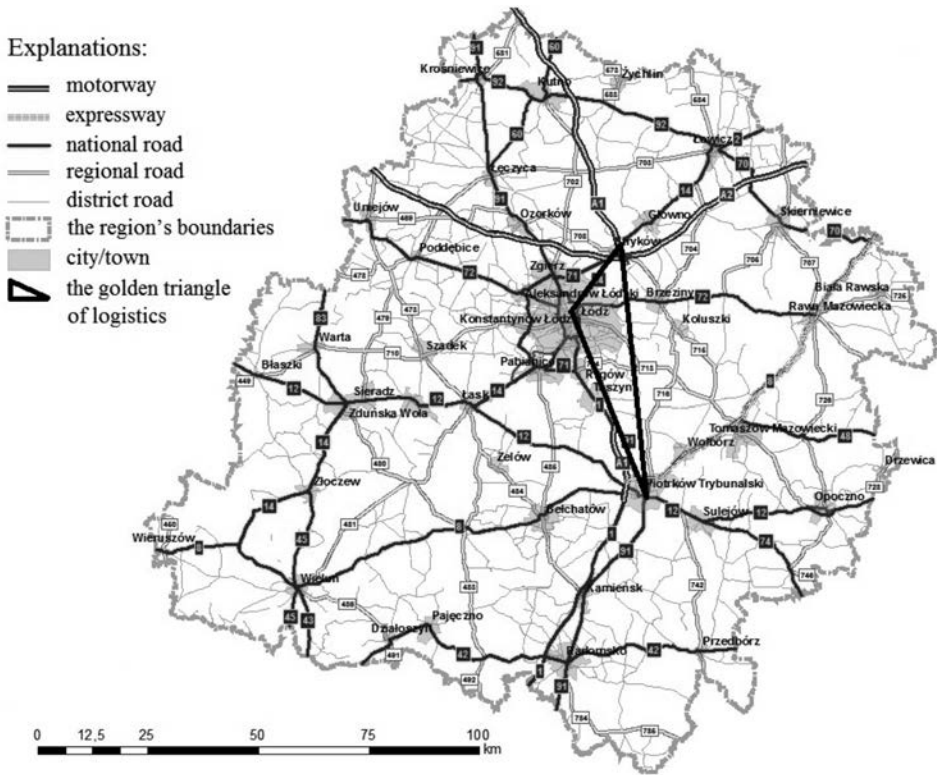


Fig. 2. The location of the golden triangle of logistics against the background of the transport road network of the Łódź region
Source: author's elaboration

principle of public and private partnership. In the first case the logistics centre may come into existence when logistics operators with their own infrastructure appeared earlier on the given territory. Given favourable conditions they may begin to co-operate on the electronic market of logistics services. In the second case it is possible for the logistics centre to arise when the initiator is the public sector. It must, however, create certain initial conditions such as specifying the localization, adopting the local spatial development plan etc. The most important thing in this model is the attitude of the public administration to investors (Fechner, 2004).

As for logistics centres enabling intermodal transport, it is worth stressing that there are prerequisites for intensive development of intermodal transport in Poland due to the country's localization on the intersection of main European transport corridors (with the notable example of the Łódź region), the development of the Polish economy and the standard of living of its society coupled with the European

integration. These factors influence the increase in domestic and international transportation as well as in transit.

Considering the expected surge in trade and transport of goods in the region of the Baltic Sea, efforts aimed at more integrated and sustainable transport must be correlated with spatial planning both on the national and international level. One of such activities refers to development of logistics centre networks which will have a viable impact on the increase in effectiveness of movement of goods. It is also necessary to implement spatial planning which promotes the use of sustainable means of transport (Klapita and Svecova, 2006).

In a situation when the significance of logistics systems as a coherent whole is not perceived with sufficient attention, the strategic aim for new activities in this area should include integration of different transport networks within and among logistics centres so as to improve and develop the quality of logistics networks.

Activities on the part of authorities at the national and European level should focus on integration of connections among logistics centres in a sustainable way on the spatial platform, creating durable and integrated approach to spatial planning of logistics centres and transport infrastructure. Furthermore, it is necessary to remember about the territorial assessment of the influence of logistics investments on the selected transport corridors in which logistics centres are located, which should result in establishment of a common vision of future spatial development along transport corridors to eliminate bottlenecks in connecting the centres with their background area (Kabashkin, 2007).

The need for consistent policy and spatial planning which caters for logistics centres is also justified by a large land surface absorbed by large-format warehousing facilities and technical infrastructure which accompanies them. Social costs connected with intensive road transport should be reduced by shifting cargos to railway or water carriers (Hesse and Rodrigue, 2004). Transport corridors constitute a natural area of eliminating these costs.

O'Connor (2010) draws attention to the town's role in the process of localization of logistics centres. On the one hand, it is a ready market for logistics operators collaborating with the given centre. On the other hand, towns are accompanied by infrastructure of key importance for logistics centres, such as airports or motorway hubs.

Another problem is spatial deconcentration of logistics facilities and distribution centres as well as polarization of logistics operations connected with lack of collaboration and agreement among different local authorities as far as spatial planning and localization of transport and logistics hubs are concerned (Dablanc and Ross, 2012). To decrease the negative impact of goods transport on the town's space it is necessary to consolidate cargos as well as ensure well-thought locations for consolidation centres having in mind requirements and features of individual towns affecting the given centre logistics (Olsson and Woxenius, 2014).

3. THE EUROPEAN UNION TRANSPORT POLICY AND LOCALIZATION OF LOGISTICS CENTRES

The European Union shares competences related to pursuing the transport and trans-European networks policy with the member states (Article 4 of the Treaty on the Functioning of the European Union). Pursuing the policy in the scope of transport and trans-European networks results from the necessity of ensuring free movement of goods, persons, services and capital within the European Union market without any internal borders (Article 3, point 2 of the Treaty on the European Union, Article 26, point 1–2 of the Treaty on the Functioning of the European Union). It also arises from the objective to achieve economic, social and territorial coherence and harmonious development of the whole territory of the European Union (Article 3, point 3 of the Treaty on the European Union, Article 174 of the Treaty on the Functioning of the European Union). It is then logical that the indicated aims of the transport infrastructure and trans-European networks policy are financed from the European Cohesion Fund (Article 177 of the Treaty on the Functioning of the European Union).

Common transport policy of member states of the European Union focuses on establishing principles of functioning of international transport together with conditions of transit through territories of member states and also principles of access of foreign carriers to domestic transport of every member state (Article 91, point 1 of the Treaty on the Functioning of the European Union).

The trans-European networks are established by the European Union not only in transport infrastructure (TEN-T, or the Trans-European Transport Networks) but also in telecommunications infrastructure (eTEN, or the Trans-European Telecommunications Networks) and energy infrastructure (TEN-E, or the Trans-European Energy Networks). The trans-European transport networks involve not only transport infrastructure but also systems of movement management and geographical positioning systems (Napierała *et al.*, 2013a). The transport infrastructure includes road and railway networks, inland shipping networks and ports, motorways of the sea, sea shipping ports and airports.

The EU documentation, complementing the list of nodal elements of transport networks, expressly emphasizes the importance of inter-modal and multi-modal hubs (Article 3, EU, 2010c). They are referred to as integration places of the above-mentioned networks, which admittedly are not directly exemplified in the form of logistics facilities, yet their functional description fully overlaps with literature definitions of logistics centres.

In the scope of trans-European transport networks, the main task of the European Union is to ensure cohesion among central and peripheral regions of the Union through development of transport, telecommunications and energy industry, which forces the Union's bodies to prepare projects of trans-European networks (Article 170 and Article 171, point 1 of the Treaty on the Functioning of the European Union). TEN-T operating

development aims were indicated in the decision of the European Parliament and the Council as of the 7th July 2010 on EU guidelines concerning development of trans-European transport networks (EU, 2010c). They concentrate on the issue of ensuring sustainable movement of goods and persons, with acknowledgement of social aspects, environmental protection, security and transport quality (Napierała *et al.*, 2013a).

In the aforementioned document of the European Parliament and of the Council, apart from disclosure of basic issues concerning framework plan of modernization and integration of land, sea and air transport infrastructure, there are references to multimodality of trans-European connections (Article 1, point 1–2, Article 2, point 1, EU, 2010c). They should constitute some kind of general guidelines for the decision about a logistics facility location and the scope of its functionality.

Attachments to the decision of the European Parliament and the Council include a project of the course of TEN-T for every member state, including Poland. Pursuant to the maps attached to the document (EU, 2010a), TEN-T in the Łódź region includes: as far as the road system is concerned A1 and A2 motorways and S8 expressway in the so-called Bełchatów option. As for the railway network (EU, 2010b), the following lines were included in TEN-T: no. 1 with its course close to the south-north orientation, connecting Warsaw with Upper Silesia (Katowice). Within the borders of the Łódź region line no. 1 links Skierniewice and Koluszki, one of the most important railway hubs in Poland. The second line (no. 3) with the course close in turn to the east-west orientation Słubice–Warsaw on the territory of the Łódź region connects Kutno and Łowicz. Line no. 11 (Łowicz–Skierniewice), no. 12 (Skierniewice–Pilawa–Łuków–Biała Podlaska–Terespol) and no. 131 (Tczew–Bydgoszcz–Inowrocław–Zduńska Wola Karsznice–Tarnowskie Góry) were also included in the network.

The contents of the White Paper of the European Commission seem to be of particular importance for logistics centres as they include a plan of establishing a single European transport area, i.e. efforts to achieve competitive and resource-efficient transport system. The provisions of the document expressly stress the necessity of introducing solutions aimed at multi-branch nature of transport. The Book refers to both transport of goods and persons. Considering its guidelines concerning still a high proportion of car transport (especially on short and medium-length distances) with simultaneous gradual overtaking of transport of goods by railways it is necessary to pursue the transport policy in such a way as to eliminate barriers which are present where these two domineering branches of transport meet. A system solution consists in construction of logistics centres since it allows to make multi-modal solutions more attractive and it combines with the furthest possible elimination of infrastructure barriers. Creating a system of hub points coherent with the network of transport corridors would allow for smooth changes of the branch of transport depending on the characteristics of the given section in the supply chain.

The European Commission defines precisely aims concerning establishment of a competitive and resource-efficient transport system. By 2030 almost one third of road transport of goods on distances exceeding 300 km will have been replaced

by railway or water transport. These restrictions will have been extended to half of all long-distance shipments by 2050. 'Hard' solutions will be accompanied by simultaneous attention to high quality of the network of connections and creation of support in the form of suitable information services. All operations aimed at achieving these strategic aims by 2015 are coordinated by the Trans-European Transport Network Executive Agency established pursuant to the resolution of the European Commission as of 26 October 2006 (EC, 2007).

The postulate of creating a community instrument of financing development of trans-European networks, 'Connecting Europe Facility', first appeared in the communication of the European Commission as of 19th October 2011 (COM, 2011a). Its contents of diagnostic character enumerate main areas of underinvestment in transport infrastructure, clearly stressing the low level of its interoperability. This gave rise to passing the regulation of the European Parliament and of the Council establishing the 'Connecting Europe Facility' financial instrument. The emphasis on the regulation contents and the volume of funds allocated for its completion in the period 2014–2020 force to place special attention as for localization of logistics centres. In the course of numerous consultations it was established that the target pace and directions of infrastructure development, particularly programmes of development of trans-European networks, require appreciable financing from the community funds. 'Connecting Europe Facility' is the answer to the above postulates.

The above-mentioned postulate of the European Commission contains preliminary proposals connected with the development of core transport networks. It is of key importance for the Łódź region to see completion of investment in two corridors of the core network: the Baltic-Adriatic Corridor (modernization of the railway line from the coast to Upper Silesia) which runs through the western part of the region as well as the Warsaw–Berlin–Amsterdam/Rotterdam–Felixstowe–Midlands Corridor. The postulate of the European Commission concerning the Directive on interoperability of the railway systems within the EU borders (COM, 2013) seems to be vital here. Transport potential of the Łódź region combined with legal basis on the international level open perspectives of dynamic development of logistics. It is necessary, however, to ensure coordination of investments in this field, which will allow to avoid localization errors.

In February 2012 the European Commission formulated the final version of the proposal to pass a new regulation of the European Parliament and the Council on community guidelines concerning trans-European transport network development (COM, 2011b) in place of the document as of 2010 (EU, 2010a, b, c). The main aim of the proposal is to establish a comprehensive and integrated transport network as well as to provide basis for sustainable, economically optimal development of all transport branches. From the perspective of functioning of the logistics branch, however, the most important are provisions connected with using the potential of multimodal transport, which is to reduce considerable differences among regions in the scope of legal regulations concerning transport interoperability.

This proposal of the European Parliament and of the Council postulates a division of the TEN-T network into comprehensive and core networks. The comprehensive network comprises all existing, modernized and planned elements of the TEN-T network. The core network, in turn, consists of these elements of the comprehensive network which are of strategic importance for completion of TEN-T aims (Napierała *et al.*, 2013b).

In the Łódź region the core TEN-T network includes A1 and A2 motorways and S8 expressway in the so-called Łódź option within the section from Rzgów in the direction of Wrocław. The core section also comprises goods railway lines: the aforementioned lines no. 1 and 131 as well as line no. 4 (Warsaw–Mszczonów–Opoczno–Zawiercie) and line no. 14 (Koluszki–Łódź–Zduńska Wola Karsznice) (figure 3).

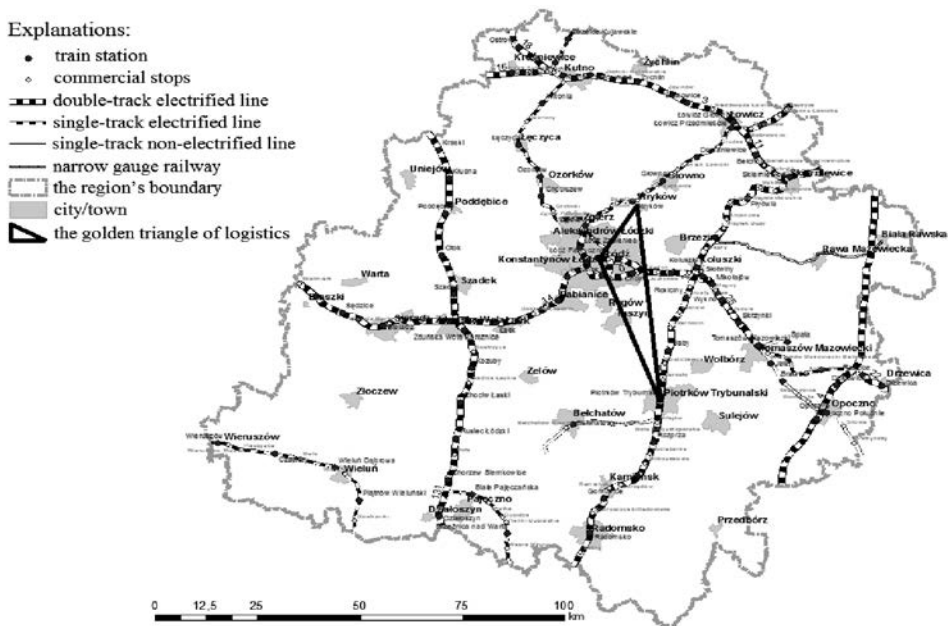


Fig. 3. The location of the golden triangle of logistics against the background of the railway network of the Łódź region

Source: author's elaboration

As for passenger railway lines, the TEN-T core network include: the planned 'Y' high-speed rail (Warsaw–Mszczonów–Łódź–Kalisz–Poznań, Wrocław), the above-mentioned line no. 4 (Warsaw–Mszczonów–Opoczno–Zawiercie), line no. 14 (exclusively on the Łódź–Koluszki section) as well as line no. 25 (exclusively on the Łódź–Opoczno section). The comprehensive TEN-T network also consists of sections of expressways in the Łódź region: S8 from Rzgów and Piotrków

Trybunalski in the direction of Warsaw, S12 (exclusively within the section from Piotrków Trybunalski in the direction of Radom) and S74. The railway line no. 25 (Łódź–Opoczno–Skarżysko Kamienna–Tarnobrzeg–Mielec–Dębica) was classified to the comprehensive TEN-T network of goods railway transport. Łódź was earmarked as localization of road and rail terminal within the core TEN-T network while Stryków as part of the comprehensive network.

As for logistics centres enabling intermodal transport it must be stressed that there are premises for intensified development of intermodal transport in Poland due to its localization on the intersection of main European transport corridors. This factor brings about an increase in domestic and international transport as well as transit services. The Łódź region stands out in this respect as within its boundaries there are over 20 logistics facilities of different sizes and functional character. They form clear concentrations, mainly in the vicinity of Łódź, Stryków and Piotrków Trybunalski. Single facilities are also situated in Kutno or Rawa Mazowiecka.

The greater majority of hub elements of the logistics chain has been located in ‘the golden triangle of logistics’ being part of the course of transport corridors of international importance. Ten of them are situated within the boundaries of Łódź in the part of the city earmarked for warehousing and storage operations, with the vast majority of them on the split of the railway network based on lines no. 14, 17, 458, 540 and 541. Car transport, on the other hand, is based on the regional road no. 713 and the national road no. 1. Among these facilities only Łódź Olechów Container Terminal is based on intermodal transport, whereas other facilities are one-branch companies using only car transport.

The second most numerous logistics facilities are in the Stryków commune where there are four logistics centres. Similarly as in the case of Łódź-based entities these are centralized facilities orientated toward exclusively car transport which in the case of the Stryków commune may take place on A2 motorway, A1 motorway, national roads no. 71 and 14 as well as the regional road no. 708. Possible intermodal solutions could become implemented using the railway line no. 15.

Piotrków Trybunalski is another place with accumulation of logistics infrastructure (two logistics centres) alongside with the communes neighbouring with it (two more logistics centres). These centres function using solely car transport which, like in Stryków, constitutes the most important localization factor for this kind of entities. In Piotrków Trybunalski there is A1 motorway joining S8 expressway (Piotrków Trybunalski – West hub) and the national road no. 8 (Bełchatów hub). The national road no. 91 (joining with S8 Piotrków Trybunalski – North hub), the national road no. 12 and the regional road no. 716 also go through the area of Piotrków Trybunalski. Possible intermodal solutions could become implemented using the railway line no. 1.

The terminal in Kutno is a logistics centre which does not form part of ‘the golden triangle of logistics’ but represents an excellent example of intermodal

solutions in the trans-European transport corridor. The entity functions using the road network of A1 motorway linking the Kutno – East hub with the national road no. 92 as well as the national road no. 60 and the regional road no. 702, thanks to which it may efficiently provide car transport services. The railway line no. 3 and the vicinity of lines no. 16, 18 and 33 ensure adequate access for cargos received or sent further on. The logistics centre in Pabianice is centralized and it operates thanks to car transport mainly on the national roads no. 71 and 14. A very important element of the area's transport network is the existing ring road of Pabianice and the planned western ring road of Łódź in the form of S14 expressway.

Baltic-Adriatic Corridor is potentially the shortest, cheapest and most economically and environmentally efficient north-south route through Poland (Gdynia/Gdańsk and Świnoujście/Szczecin). To make this possible, the Local Government Agreement was initiated for the Baltic-Adriatic Corridor, signed by six local government associations in Poland. Transport policies of a general nature, focused on the competitive position of intermodal transport are often ineffective because they usually do not take into account the private interests of the parties operating in the supply chain. Successful promotion of intermodal transport is the most critical activity in order to achieve sustainable transport, which is one of the main objectives of transport policy in the European Union. For this reason, the European Commission, as part of research projects and financial instruments, supports the policy, design and development of advanced tools to promote intermodal transport (Tsamboulas *et al.*, 2007).

4. THE TEN-T NETWORK AND LOGISTICS OPERATIONS

Both the national and regional logistics system is based on diversified elements of transport infrastructure. It should also be characterized by a high degree of infrastructure standardization. In case of linear elements this is primarily connected with the quality, technical parameters and density of transport and telecommunications infrastructure. In reference to nodal elements, on the other hand, it is availability to the key transport hub that matters. Such availability should be understood, above all, in the context of time and economic distances. Real physical distances (dividing the journey starting point with its potential destination measured according to the course of the road or railway line) are nowadays of secondary importance. Transport availability, irrespective of its definition, has a vital application dimension since it represents an element of diagnosis of difficulties in the movement of goods and persons, giving grounds to pursue appropriate transport policy aimed at territorial cohesion (Rosik, 2012). Transport availability is also considered to be an essential element of space organization

being directly reflected in diversification of attractiveness of individual locations. It is an important factor shaping, for instance, the standard of living or investment attractiveness of the given site. All this is of great significance when logistics centre availability is considered. Its development is connected with its potential influence, the size of the covered area, possibility to recruit employees and win clients, which in turn is directly connected with availability levels of the facility. Transport availability plays an even more important role in case of the whole logistics system on the given area. Only ensuring high levels of transport network availability of all system elements may result in adequately high level of competitiveness of the given area (Guzik, 2011).

Transport network must also enable creation of intermodal transport solutions and effective use of benefits arising from localization of logistics operations within the transport corridor (Fechner, 2010). It is also necessary to consider the course of transport corridors in location analysis because of infrastructure equipment and also due to very positive forecasts related to cargo flows in the future. Although by 2030 the dynamics of surges in traffic will have decreased as a result of limitations of technical (congestion) and economic nature (increase in prices of fuel, employing logistics solutions boosting cargo flow), on some international roads the traffic volume will exceed 20 or even 30 thousand vehicles per 24 hours (Lipińska-Słota, 2010).

Focusing on forecasts concerning directly the Łódź region, it is worth pointing out that the load for corridor II on the section Świecko–Błonie may reach the maximum of 261,334 t, 321,870 t and 382,498 t in 2020, 2025 and 2030 respectively. Cargo flow in corridor VI will reach lower yet still considerable figures. On the section Gdańsk–Łódź cargo traffic may reach as much as 94,837 t, 116,133 t and 137,453 t in the consecutive years in question. Very high values will be achieved also on the section Łódź–Katowice (247,818 t, 303,559 t and 359,365 t).

In recent years rail transportation of goods has been slightly on the increase. The market of rail transportation is gradually opening and it may be expected that by 2030 this upward tendency in cargo transportation will continue. Individual sections of corridor II on the area of the Łódź region may receive traffic flows of 33,019 t in 2020, 34,710 t in 2025 and 36,301 t in 2030. The traffic flow of cargos transported by rail in corridor VI may reach up to 88,865 t, 93,415 t and 97,698 t (Lipińska-Słota, 2010).

The problem of transport corridors is directly connected with the issue of functioning of logistics centres. Transport share in realizing logistic processes is essential. Logistics centres are indispensable for functioning of intermodal transport as they are responsible for completion and preparation of container batches (Nowakowski *et al.*, 2010). It is apparent to see the link between transport corridor, and consequently the number and form of transport infrastructure, with localization of logistics centres built in correlation with the principle of transport intermodality. In the localization aspect, but not only, logistics centres relying on

the transport intermodality principle refer to the course of main transport corridors. Transport corridors understood as stripes of land where at least two means of transport overlap are a natural construction sites of intermodal logistics centres. Moreover, transport corridors centre the traffic flow which in certain proportions tends to the logistics centre due to the necessity of reloading, re-packing and other elements of logistics process service. Transport corridors are also, according to Fechner (2010), a kind of mobile warehouses which become unloaded in hub points, i.e. logistics centres.

The strategic importance of transport corridors in the case of Poland is a direct result of the fact that international trade is based on maritime transport. Ships carry about 80% of containerized cargo. There is a constant trend to larger container exchange reducing the number of ports capable of handling such cargo. Today, there are only a few dozen in the world. This concentration is the lack of a uniform and proportionate network connections. Baltic and Adriatic ports, situated in the area of sonar, prepare for meaningful participation in global trade. It also includes the ports of Gdynia and Gdańsk. Baltic Outlook 2030 forecasts for the ports of Gdynia and Gdańsk largest increase in trade turnover among Baltic ports (Baltic Transport Outlook 2030, 2011). The efficient functioning of the Valley Logistics plays a very important role in rail transport. Currently, it performs only 5% of the flows of goods covered by international trade. However, before this type of transport is a qualitative revolution. In November 2010 entered into force EP and the Council Decision establishing a European network of rail corridors. One of them is corridor no. 5: Gdynia–Bologna–Ravenna/Koper/Trieste. This corridor is expected by the end of 2015., which can have a direct impact on the intensification of development of logistics facilities in the Łódź region. Logistics investments in Poland must be rapidly developed due to the amount of goods transported in the region, which in 2030 will increase by over 40% compared to 2010. (Baltic Transport Outlook 2030, 2011). All Polish ports of key importance for the economy support persistent connections with Scandinavian shipping ports. Their previous biggest problem – poor availability of transport – gradually gives way, thanks to a combination of new investment and this implemented under the Baltic-Adriatic Corridor.

EU for the development of the TEN-T recommend outside actions, aimed at key sections of the transport network integrated approach to transport in urban areas. According to these urban node means the area of the city where the transport infrastructure of the TEN-T, such as ports, including passenger terminals, airports, railway stations, logistic platforms and freight terminals located in urban areas or in their neighbourhood, are connected to the other parts of the infrastructure and facilities for the regional and local traffic. Thus, the location of transport terminals has a major impact on urban and regional logistics. Thus the transport corridors is an idea whose fundamental objective is to strengthen the strategic relations between the states and regions. Intensification of the indicated links is implemented

by improving their mutual availability of transport, the intensification of flows of goods, people and information and promotion of new directions of the movements.

5. CONCLUSIONS

Considering the theoretical assumptions of functioning of logistics centres, the European Union's transport policy and business practice of logistics centres in the Łódź region, it is possible to specify guidelines the implementation of which may contribute to boosting the effectiveness of functioning of logistics facilities with simultaneous appearance of synergy effects at the meeting point with transport flows realized in the trans-European transport network.

Undoubtedly a great improvement would be a coherent vision of functioning of logistics centres and the course of transport lines at local, regional, national and international level, which is connected with meeting universal analysis and monitoring standards as well as detailed documentation. For this purpose it would be helpful to adopt benchmarks from documents characterized by possibly greatest degree of generality which is displayed by the documents provided by relevant organs of the European Union (Napierała *et al.*, 2013b). It is also recommended to elaborate a coherent terminology connected with logistics centres bearing in mind the commonly used typology of facilities due to the functional criterion.

It is necessary to pursue effective information policy aimed at potential stakeholders, concerning possible benefits arising from the planned course of the TEN-T network, which should constitute an essential factor determining the location of new logistics centres. In this scope one must remember about logistics operators whose knowledge of the market of logistics services is considerable and important for the purposes of creating optimal market situation, infrastructure planning or the course of new transport lines.

The process of location of logistics facilities requires constant monitoring of the use of the road and rail network. The process could enable, in the long run, identification of main transport corridors and future optimization of their course, which should be directly connected with supporting location decisions by systematically provided information in the form of micro- and macro-spatial analyses. Such large objects as the logistics centres cannot function in isolation from the policies pursued by the local authorities of the area in which they operate. It is very important that the representatives of each party remain in constant contact. For the sake of both 'players' actions are required – to support the development of the municipality from the centres, while simplifying the operation from the municipality. The fundamental motive to engage local government authorities in the functioning of the centres is the need to regulate the processes and increase space metropolization to boost its competitiveness. Nowadays it is necessary to

continuously strive for current and potential investors, since the relocation of business is becoming easier. When the environment of the company becomes unattractive, the investor moves activities, providing a direct signal to other market participants about the shortcomings of the location. Therefore, local authorities in all their activities relating to the development of logistics centres should consult such studies as the National Development Plan, the National Strategy for Regional Development, the National Spatial Development Concept and National Transport Policy. It is also necessary to take into account the content of the documents that define the regional development strategies and local structures that are geographically or functionally associated with the investment.

The operation of logistics centres should be given special attention by the authorities, which should take active part, carrying out their activities in order to meet the economic needs of the local community. However, to be effective, their policy must be aimed at streamlining and not merely sanctioning changes that occur spontaneously. It is especially difficult, because currently there is no comprehensive policy relating directly to the process of entering large-scale logistics investment.

Local development plan, mentioned above, simplifies the whole procedure significantly. The designer, after seeing the extract from the plan, is only required to make the environmental impact assessment of the proposed investment and can then proceed to comprehensive planning. After a period of about half a year (depending on the complexity of the investment) will be issued a building permit. The situation changes completely when the area is not covered by the LDP. First the investor is obliged to develop EIA. Then the designer applies for planning permission (decision on conditions of up-building). It is necessary to provide in the application the project data, which at this stage are only preliminary and in most cases change in progress. It should also be noted that the zoning procedure for logistics investment is problematic. In the vast majority of cases, the warehousing investment projects are located on yet untapped areas where it is impossible to continue development. While providing technical infrastructure and access to a public road usually does not cause much difficulty, the majority of the proposed large-scale objects are at least partly on agricultural land or forest. Therefore they require exclusion from agricultural and forestry production, which excludes zoning. Of course, the investment may also be in conflict with other regulations (e.g. the Nature Conservation Act), which also disqualifies its location. It can be concluded that in many cases the procedure for issuing a zoning approval is a fiction, but unfortunately, in the absence of effective solutions, it is necessary. Obtaining the decision is often not synonymous with transition to the next phase of the investment process. In many cases, the conditions imposed in the decision force creation of a new version of the EIA (for the updated project). Each of these cycles takes about half a year and, of course, substantial funds. To avoid such situations it is necessary to move the period of EIA creation to the phase of applying for planning permission (decision on conditions of up-

building). It is also necessary to develop a tool alternative to zoning for location of storage or industrial investment. Under current regulations permissions for single-family houses and logistics centre are issued on the same basis.

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**ANTHROPOGENIC TRANSFORMATION
AND THE POSSIBILITY OF RENATURALISING SMALL
RIVERS AND THEIR VALLEYS IN CITIES
– ŁÓDŹ AND LVIV EXAMPLES**

Abstract. Rivers used to serve important functions in the development of cities, and river valleys are a part of the urban space. Regardless of several centuries of anthropogenic influences large rivers and their valleys have remained the dominant elements of the cityscape. In the case of small rivers and valleys the situation has been different. The expansion of urban infrastructure often led to an elimination of rivers and their valleys from the developed area. In many cases rivers were directed down straightened concrete ditches and sometimes the locations of their channels were changed altogether. In the city centre, rivers were locked in underground channels, i.e. they vanished from the cityscape. Urban floods, so annoying for the inhabitants, usually occur within river sections which have been utilized intensively and covered with impermeable surface. Even though a river was hidden in underground interceptor pipes, a valley dip remains still accumulating rainfall. The aim of this article is to present the extent of transformation of small rivers and valleys within two large cities located on watersheds: Łódź and Lviv, and the contemporary utilization and the possibility of renaturalising them.

Key words: small river in the city, anthropopressure, urban flood, rivers valley management.

1. INTRODUCTION

Rivers used to serve important functions in the development of cities and river valleys are a part of the urban space. Regardless of several centuries of anthropogenic influences large rivers and their valleys have remained the dominant elements of the cityscape. Extensive valley floors, steep slopes and flat uplands right next to them defined the directions of spatial expansion.

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Flood prevention has always been a top priority but no one has ever tried to remove a river from the urban space. In the case of small rivers and valleys the situation has been different. The expansion of urban infrastructure often led to an elimination of rivers and their valleys from the developed area. In many cases rivers were directed down straightened concrete ditches and sometimes the locations of their channels were changed all together. In the city centre, rivers were locked in underground channels, i.e. they vanished from the cityscape. In extreme cases people even forgot about their existence and every time there is an areal flood, people are surprised and ask about what caused it. Urban floods, so annoying for the inhabitants, usually occur within river sections which have been utilized intensively and covered with impermeable surface (streets, squares, roofs). Even though a river was hidden in underground interceptor pipes a valley dip remains still accumulating rainfall. Overland flow in cities is higher (comparable to that of mountainous areas) because the sealed surface does not allow almost any infiltration. That is one of the major problems in anthropogenically transformed valleys within a city (Schmitt *et al.*, 2004; Postnote, 2007; Zevenbergen *et al.*, 2010; Kundzewicz and Kowalczak, 2014).

In recent years there have been attempts to recreate the richness of the hydrological network to retain overland flow, improve the quality of the environment and the landscape. Renaturalization of a stream is a complex set of procedures, activities, building and maintenance actions and natural processes whose goal is to recreate the natural condition or close to natural condition of a river which had been engineered within existing limitations (Biernat, 2007; Czoch *et al.*, 2010; Bańkowska *et al.*, 2010). The large group of systemic renaturalization activities carried out in river valleys can be divided into the following priority areas: creating protective zones free of any business infrastructure for the streams; gradual reclaiming of floodplains by excluding them from intensive usage and, if possible, removal of business infrastructure; using floodplains to recreate the vertical distribution of the river (meanders, oxbows, islands); improving landscape feature of the stream. Renaturalization of rivers has several spatial, technical, legal-administrative, economic and natural limitations (Żelazo and Popek, 2002). Therefore the initiatives undertaken in cities are usually of the revitalization type where the goal is to recreate the ecological functions of streams by improving water quality and recreating the properties influencing the life and growth of various organisms. Such actions do not change the morphological features of the valley.

The aim of this article is to present the extent of transformation of small rivers and valleys within two large cities: Łódź and Lviv, and the contemporary utilization and the possibility of renaturalising them. In natural conditions, drainage zones displayed a richness of springs, wetlands, small streams and short rivers. Expanding cities gradually absorbed new streams and valleys and more and more area was being covered with impermeable material which had an influence on the

functioning of the river network. Currently both cities have similar problems with surface water and are seeking ways of reintroducing rivers into the urban space.

2. SCOPE OF STUDY AND METHODS

The study was conducted in two cities located on drainage divides. Lviv is located on the main European drainage divide of the Baltic and the Black Sea divides whereas Łódź on the divide between the Vistula and the Oder drainage basins. The cities have similar populations but are different in terms of area. Lviv has nearly 766,000 inhabitants and occupies 171 sq. km whereas Łódź has 725,000 inhabitants and occupies an area of 293 sq. km. Both cities are located in temperate climate zones with annual precipitation of 715 mm in Lviv and 650 mm in Łódź (Mucha and Wawer, 2010; Wibig, 2011). They also have distinctive city centres with very dense building distribution and a considerable share of artificial, impermeable areas.

The natural river network and the stages of its transformations were presented based on the analysis of historical and contemporary maps and literature. In the case of Łódź, maps published between late 18th century and mid-20th century as well as studies regarding the construction of factories and industrial plants were extremely useful (Puś, 1987; Rosin, 1989; Janik *et al.*, 2012). Old photographs and designs for engineering the Łódka released by the Water and Sewage Company in Łódź have also been used. The information regarding the river network in Lviv were collected on the basis of maps from various periods of the city's development published in an atlas from 2012 (Shabliy, 2012).

The contemporary utilization of valleys, water problems and the scope of renaturalization works of rivers in Łódź is presented on the basis of urban survey conducted in 2013 and previous long-term observations and analysis of studies and designs for the drainage basins of the Bzura and the Sokołówka (Kujawa *et al.*, 2003). The observations of the utilization of river valleys in Lviv were conducted in 2010.

3. VALLEYS AND RIVERS IN ŁÓDŹ

Łódź is located in the Vistula and the Oder drainage basins with the drainage divide running through northern and eastern parts of the city (figure 1). The local river network is composed of numerous small streams. Customarily, twenty streams running through the city are referred to as rivers (average annual flows from 0.01 to 0.7 m³/s). Additionally, there are 36 named streams and many more

smaller unnamed ones (Wierzbicki *et al.*, 2010). The majority of the rivers have their springs at the foot of a hill located in the NE part of the city. The lengths of rivers within city limits vary from 12.5 to 22.5 km. The remaining streams measure in total between 2.8 and 7.5 km.

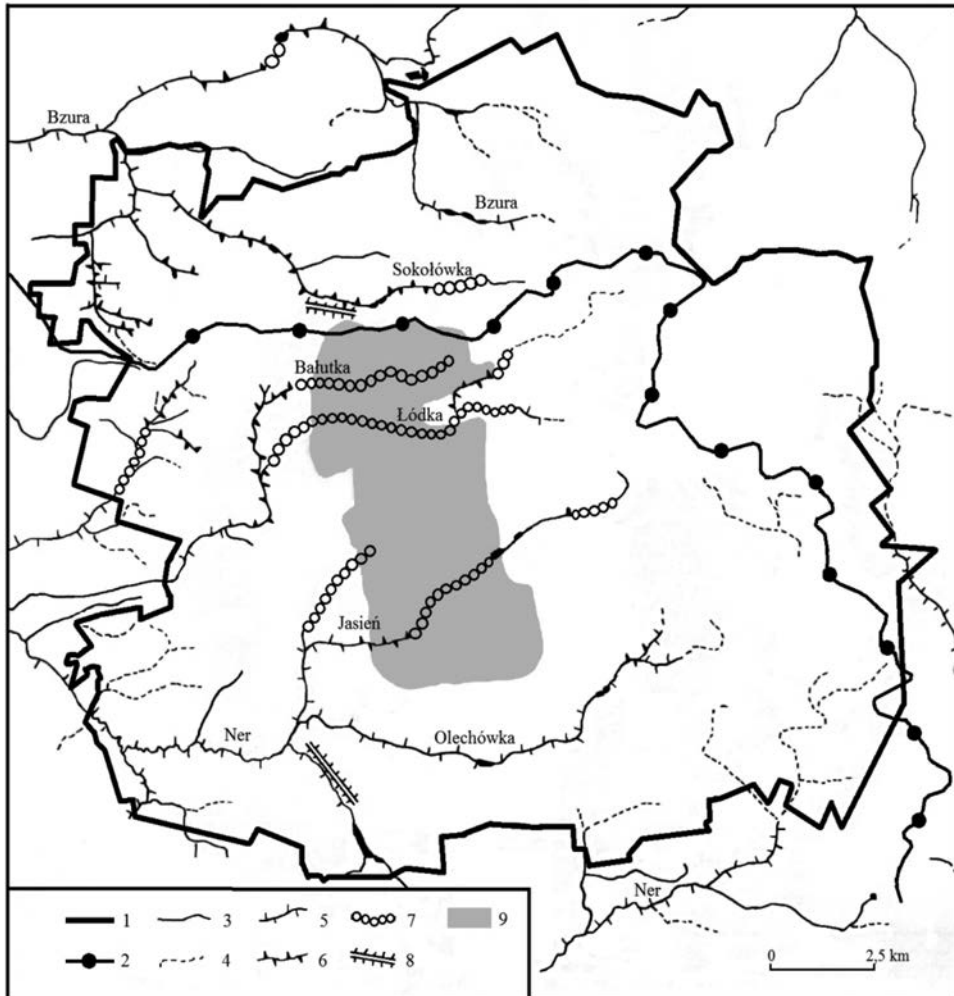


Fig. 1. Surface waters and river channel engineering methods in Łódź

1 – urban boundary, 2 – the watershed of the Vistula and the Oder, 3 – rivers, 4 – seasonal water-courses, 5 – regulated rivers, organic riverbank consolidation, 6 – regulated rivers, concrete riverbank consolidation, 7 – river in the underground canals, 8 – embankment, 9 – compact built-up downtown area

Source: author's elaboration based on Biezanowski (2001), Jokieli and Maksymiuk (2002), Kobojeł (2013)

In their natural state, Łódź rivers were narrow (1–2 m) and not too deep (0.3–1 m) but they featured high gradients of 4–8‰ (Koter, 1988). The valleys changed along their courses. Upper sections of the rivers flowed in deep narrow valleys with steep slopes and had the highest gradients. In today’s city centre, the valleys became wider, their slopes became gentler and their gradients more even. In the western part of today’s Łódź rivers formed wide valleys floors where they meandered and formed backwaters after spring thaws. Obviously the most convenient location for urban development was in the middle section (Koboжек, 2013).

The oldest part of the town was built in the 15th century within the flat area at the feet of Łagiewniki Hills. When in the early 19th century the idea arose to build a centre of textile industry in Łódź, its proponents emphasized the availability of surface waters (rivers and springs) among other advantages of the location. Rivers were used in weaving shops and their clean waters were a vital resource for manufacturing textiles. During the construction of industrial complexes, small rivers did not pose a significant technical problem which is why, if necessary, their fragments were moved and their former channels were buried. Today, this poses a significant problem in wet years. It is often the case that intensive showers result in water running through cellars according to the former natural channel. The introduction of the steam engine in 1839 in factories and the ongoing urban development of the city resulted in turning the rivers into sewers. The construction of a city sewage system did not start until 1925. The system utilized river channels as discharge routes for residential and industrial waste water together with rainfall collected through street outlets. In time, considerable sections of the rivers running through the dense city centre were directed through underground channels and vanished from the cityscape (figure 1). They remain underneath the streets or developed areas (figures 2, 3).

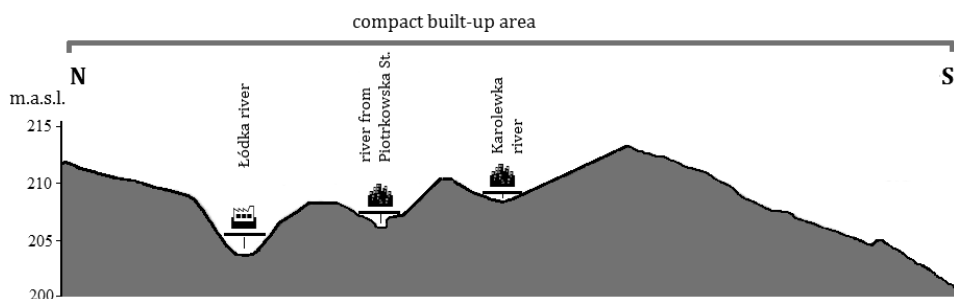


Fig. 2. Rivers valleys in a hypsometric profile of the centre of Łódź in longitudinal distribution
 A factory was built within the axis of the valley of the Łódka in 19th century
 The stream valleys from Piotrkowska Street and the former springs
 of the Karolewka were covered and developed with buildings
 Source: author’s elaboration



Fig. 3. A former factory and now the Manufaktura shopping centre was built within the bottom of the Łódka valley, river, channel in the underground canals
Source: photograph by E. Kobjek

The channels of two rivers with the strongest connection with Łódź (the Łódka and the Jasień) have also undergone considerable transformation. 15.6 km out of 20 km of the Łódka's total length remains within city limits. In its upper section, the river flows through a trapeze ditch in a clearly defined valley but soon enters a covered channel built in 1931 only to emerge later down its course (figures 4, 5). In the city centre it again runs in a covered channel, sections of which were built in 1917 and 1967, for 5.3 km (Bieżanowski, 2001). It re-emerges only in the Józef Piłsudski Park in the western part of the city but runs through an engineered concrete channel. Until the 1930s the area of the park was one of the wettest and during spring thaw one of the most often flooded sections of the valley. Construction works in the park started in 1927. The wetland area of the valley was buried and hardened and sections of the channel were moved by a few dozen metres. The designers used low-lying elements of the relief and created a complex of park and recreation ponds. Today, it is the biggest city park in Łódź.

The Jasień was one of the most important rivers of industrial Łódź. Its entire course (12.6 km) falls within city limits. In early 19th century the depth of the river reached 1.15 m and the gradient in the upper section was 8‰ (Koter, 1988). In 1825 new textile plants were established along the Jasień which used the river's water for manufacturing processes but after the introduction of the steam engine in 1839 the river became less useful (Jaskulski, 1995). Within a few years the



Fig. 4. Straight, regulated part of the river in the park
Source: photograph by E. Kobojeck



Fig 5. Pond within the bottom of the Łódka river valley in the municipal park
Source: photograph by E. Kobojeck

Jasień became a stream collecting street waste water. Data from 1860 showed that the river's depth decreased to 30–40 cm and its spring moved west by 1 km (the river became shorter). In the final decade of the 19th century Scheibler's factory was established directly on the channel of the Jasień. The river ran underneath the factory floor enabling discharge of waste water. Its channel was dislocated outside the factory and directed through a covered channel as late as in the 1960s. Today, the Jasień is an engineered stream for discharging rainfall. A part of it runs through a covered channel and its lower section through an engineered and reinforced channel (figure 1).

Old streams function in the city centre only during infrequent surface supply and discharge of storm water system. Additionally, as a result of intensive exploitation of groundwater, their levels decreased considerably (up to a few dozen metres) which in turn resulted in the disappearance of various springs and small streams which used to combined into large groups and cut through hill sides. Transformations of the streams spurred changes in the valleys. Lower, wetland parts of the valleys were buried and hills were levelled which resulted in levelling of the surface. No evidence of many of the buried streams can be found today within the cityscape, in the case of some there are only a few low-lying areas.

Rivers and valleys located at the outskirts of today's city have been transformed the least. The valley of the Ner in the south of the city was urbanized relatively late because of a big distance from the expanding factory settlements. Engineers built ponds with a total area of 11.5 ha which soon became a major attraction of the inhabitants. Today, the spring area of the Ner in SE part of the city lost its natural character and some sections of its channel are only used for discharging rainfall. Yet, further down, the river meanders and its banks are overgrown with rich plant life. The river valleys in the northern part of the city, in an area with the most diverse relief, neither were engineered.

There are two types of floods in the city. Typical high water level due to overflowing rivers occurs mainly in the lower sections of rivers in the outskirts of the city. The larger area of the city with insulated surface is threatened with city floods resulting from exceptionally high rainfalls. Significant communication problems occurred often during extreme rainstorms as a result of large pools in the city centre which always occur in the same locations. Problems usually arise at the intersections of streets located within the axes of valleys buried in the early 20th century. Large pools also form at the intersection of Strykowska and Wojska Polskiego Streets (figure 6). This node was built within the axis of the valley of the Łódka and there are hills descending exactly towards the valley's axis. In 2013 a flood storage pond was constructed underneath the intersection.

City floods in Łódź are mainly a result of: inability to discharge excess rainfall because of drainless dips with sealed floors; too few street inlets; too small diameters of some culverts and engineered channels. The sewer system can efficiently decrease the degree of flooding only when it works properly and

if it corresponds to water discharge rates. Therefore, it is necessary to properly distribute street inlets and recreate retention properties of city streams to limit unfavourable hydrological events.



Fig. 6. The intersection located on the floor of the Łódka valley
Source: photograph by E. Koboжек

In recent years, actions were taken towards recreating retention properties of the valleys and improving the city's ecological conditions. There are no plans for extracting channels from underneath the city centre and renaturalization is being conducted on valleys located outside of the area. The works mainly include recreation and appropriation of reservoirs as Łódź rivers used to have many mill ponds. The Sokołówka, which measures 13.4 km, was the first river where the works were started. Its environment was anthropogenically transformed to a lesser extent. The plan for its renaturalization included the formation of 11 reservoirs of 0.1 to 2 ha (6 already operate) and 8 meanders (Kujawa *et al.*, 2003). Two dry reservoirs will receive flood waves during rainstorms. Their goal was to provide a basis for extending the residential district and equipping it with a rainfall discharge system. The programme may have a positive influence not only through increasing the retention properties of the drainage basin but also by increasing the

naturally active area located near residential areas. Additionally, it will provide new areas for relaxation for the inhabitants.

The valleys of the Bzura and the Łagiewniczanka are some of the least transformed forms in the city. Neither of the rivers has been engineered for discharging water from the city rainfall sewer system. This in combination with the fact that the drainage basin has low degree of sealing is why the authorities are planning to build infiltration ditches which will discharge excess rainfall water. Gradually seeping through the soil it will gravitationally supply the river further on. This will improve retention and increase the share of underground supply in the total water balance. Locations which require the construction of traditional rainfall interceptors will receive wetlands at their outlets. Those are sedimentation-filtration structures which work as small waste treatment plants. There is also a plan to conduct natural regulation of the upper section of the Bzura. The plan will include corrections of longitudinal gradients at sections with gradient over 5%. To do that the constructors will build 20–30 cm high wooden-stone partitions with added individual boulders. This will result in impoundment and improvement of water air saturation which will intensify self-purification processes. It has been suggested to assign the Bzura and the Łagiewniczanka the status of ‘small stream reserve in suburban areas’.

4. RIVERS AND VALLEYS IN LVIV

Lviv is located on the main European drainage divide which runs almost directly through the centre of the city south-eastward from the north (figure 7). Many springs where streams originate are located at the feet of the hills where the divide developed. A major portion of those springs is located in the south-eastern part of the city. The Poltva River, which runs towards the north-east, and the Zubra, which runs towards the south, are the main rivers of Lviv. Other streams present in Lviv maps are defined as brooks (Kobzjak and Mielnik, 2012). Within the city there are two wide valley formations: the valley of the Poltva in the central and north-eastern part of the city and the Bilohorska dale in the western part (figure 8) as well as a series of narrow valleys of streams which run southward.

The centre of Lviv is located in the dale of upper Poltva, surrounded by three hills 100-metre high (figure 9). The 1,100-metre-wide dale floor is flat and it used to be marshy and boggy.

The Poltva served a very important defensive and economic function between the 13th and the 18th centuries which is why its natural course was changed early. The moat of the mediaeval city was already partly supplied using the Poltva. Its channel was moved eastward. The Ortysha, a right-bank tributary of the Poltva, disappeared from the cityscape already in the 15th century after it was transformed into a moat surrounding the south-eastern part of the city.

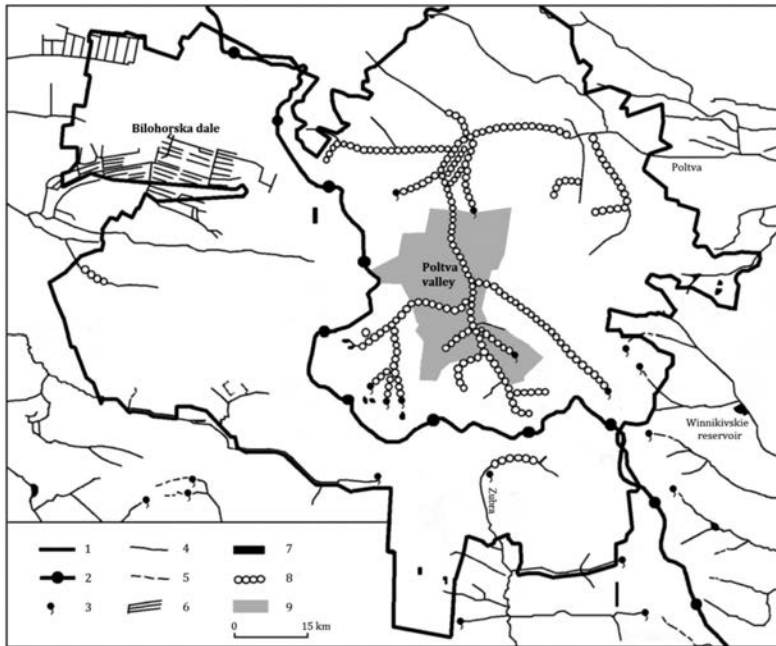


Fig. 7. River network in Lviv

1 – urban boundary, 2 – the main European watershed of the Baltic Sea and the Black Sea, 3 – springs, 4 – rivers, 5 – seasonal water-courses, 6 – drainage ditches, 7 – artificial ponds, 8 – river in underground canals, 9 – compact built-up downtown area
 Source: author’s elaboration based on Kobzjak and Mielnik (2012)

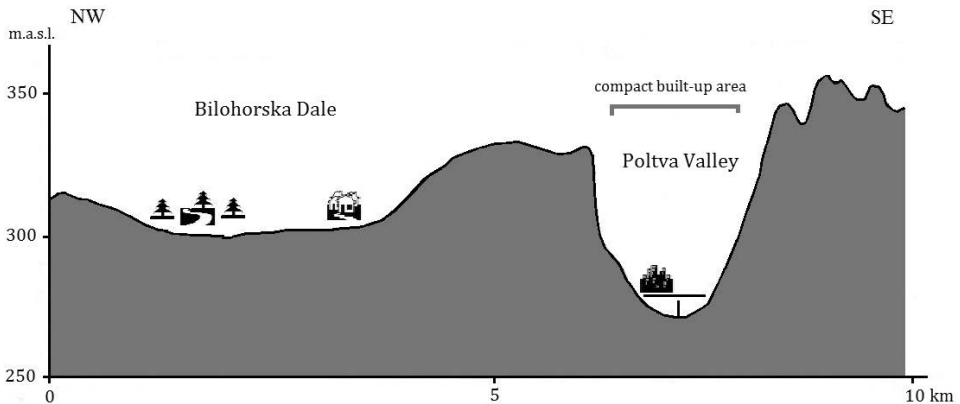


Fig. 8. Lead hypsometric elements in Lviv

The Poltva in the centre of the city is hidden in an underground canal and its valley is densely built-up; the Bolihorska dale in the eastern part has low urban density and its western part is mostly occupied with city green areas

Source: Source: author’s elaboration



Fig. 9. The centre of Lviv located in the valley of upper Poltva
Source: photograph by E. Kobojeck

As the longitudinal gradient of upper Poltva is high reaching 13% in its first kilometre, several mills operated on that section for many centuries. Most of them were removed already at the turn of the 19th century. Even bigger changes occurred in late 19th century as the river was included into the city sewer system and it was hidden in an underground interceptor for 15 km while streets were built above on the surface (Lylo and Lylo-Otkowicz, 2005). The underground river flows even today underneath Shevchenka Ave. (former Akademicka Street) and Freedom Ave. The shape of the Mickiewicz Square is a remnant of the old channel of the river. There it would divide into two channels and form a small island. In consecutive years more sections of the Poltva and its tributaries were directed underground within the limits of the developing city. Formerly marshy valley was dried, new surface was laid and channels dislocated. The centre of Lviv no longer features any river and the valley has been completely built up (over 90% of the area). The building of the Lviv Opera was also built in the valley of the Poltva, parts of it even in the river's old channel (figure 10). In 1900 the river rushed into the theatre's cellars flooding the engine room. There was an actual threat that the building might tilt and collapse, fortunately the structure was strong enough. The river re-emerges only in the north-eastern part of the city. Its discharge levels have been lowered by 80% as the



Fig. 10. The building of the Lviv Opera was built in the valley of the Poltva
Source: photograph by E. Koboжек

water is used by residential and industrial complexes. Normally, the Poltva discharges only 400–500 l of water per second but up to 60,000 l/s during rainstorms.

In the north-western part of the city there is a marshy wide low-lying area called the dale of the Bilohorski Brook filled with peat. It is now dehydrated by a system of drainage ditches (figure 7). The surface is partly occupied by a forest complex but in its eastern part there is a new complex of single-family houses being built. The dale includes the largest number of endangered hygrophytes plants from the red book of Ukraine (Zagulskiy *et al.*, 2012).

The part of the city near the divide was rich in small natural and artificial reservoirs (figure 11). In the 16th century in Lviv there were 40 ponds but the number decreased in the following centuries. In the mid-19th century there were 20 ponds and only a few at the turn of the 20th century. Some of the former ponds were built up or drained which is why they gradually lost their retentive and recreational functions. In recent years some of them have been renovated (e.g. the fountain in the Stryiski Park) or restored (the fountain in front of the Opera house within the river's axis). The Vynnykivske Lake flood storage pond on the Marunka is the largest water area in direct vicinity of Lviv's eastern border.

The rivers and valleys in the centre of Lviv have undergone considerable anthropogenic transformation. Should the Poltva be brought to the surface, it would change the entire landscape of the old town. It would be necessary to separate river



Fig. 11. Pond in the Stryiski Park
Source: photograph by E. Kobojek

and rainfall waters and construct a new storm water system. Such a project would be expensive and it would require a reconstruction of the city's public transport system as the city's thoroughfares run directly over the channel. It seems that the only solution today would be to improve the quality of discharge in the river. Valleys at the outskirts of the city which have undergone lesser transformations have higher natural chances. Partly protected green areas are being designed there. The biggest green area is to be created in the dale of the Bilohorski Brook and in the spring section of the valley of the Zubra (Krupa and Dubina, 2012). Unfortunately the plans do not take into account to improve the ecological quality of the surface section of the Poltva in the NE part of Lviv.

5. CONCLUSIONS

Revitalization of river valleys in cities is an extremely difficult task. That mainly applies to valleys of small rivers which have undergone considerable anthropogenic transformations and have been built up with various structures.

Studies show that regardless of human influence river valleys are a place where the most valuable ecosystems have remained. However, the costs of revitalising the valleys are often too high for city budgets. The implementation of revitalization activities also faces many obstacles as ecological aspects are often in conflict with economic needs. Usually, a project whose goal is to extract a river from its underground canal means narrowing communication routes and protests from the residents. There are some good examples of revitalizations of river areas in cities around the world but it is difficult to find one model of revitalization as all cities are different. Therefore, it is necessary to look for individual solutions. Revitalization of valleys should be treated as a contemporary stage of evolution of river valleys in cities which consists of reintroduction of their natural functions and strengthening the bond between the city and the river. Projects should mainly depend on the size and type of the valley, the degree of transformation and the role within the city fabric. In some cases, the only option is to improve the purity of the water. Renaturalization processes of valleys cannot only focus on the natural aspect. They also need to consider the urban development, economic, social and cultural aspects. Revitalization activities should be preceded with extensive natural and historical studies, assessment of the influence on specific elements of the cityscape and the city's functioning.

The examples of Łódź and Lviv indicate that it is not possible to reveal the entire small river, which now serves the role of a sewer, within a dense city centre. However, it is possible to improve the valleys in the outskirts as that is where the most valuable and diverse environment with the highest ecological potential has been preserved.

Disorganized developments which usually result in permanent degradation of natural and sometimes even landscape assets still pose a significant threat for valley environments. Even those small river valleys attract developments. Sometimes marshy parts of flood plains are covered with additional material and become a place where new houses are being built.

Renaturalization processes belong to long-term tasks, which sometimes can be started with marking river courses which are now hidden in underground interceptors in maps of city centres. It is necessary to re-inform people about the river and the valley and inform them about the results of overbuilding them in the city. Today, reliable knowledge and efficient exchange of information between the authorities and the society is becoming a good starting point for making even difficult and costly decisions.

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REVIEW ARTICLES

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LAND-USE STRUCTURE AND URBANIZATION-DRIVEN LAND FRAGMENTATION: REVISITING THE MONOCENTRIC MODEL IN A SPRAWLING REGION

1. INTRODUCTION

Human activity plays a crucial role in land-use changes throughout the world (Verburg *et al.*, 2004; Serra *et al.*, 2008). Changes in the use of land are among the most important human-induced changes impacting the functioning of the earth system (Lambin *et al.*, 2001; Gillanders *et al.*, 2008). Mediterranean landscapes are the result of the anthropogenic action exerted over millennia (Blondel, 2006; Blondel and Aronson, 1995) and habitat heterogeneity, due to both socioeconomic and biophysical factors, represents a source of the high level of biodiversity in the region. Actual trends in Mediterranean landscapes include loss of diversity, natural habitats and corridors due rapid urbanization processes. These mainly uncontrolled changes have a great impact on biodiversity, climate change and global warming (Francois *et al.*, 2008; Vallet *et al.*, 2008, De Aranzabal *et al.*, 2008), but land-use changes can also affect societal and territorial vulnerability to economic perturbations (Tyson *et al.*, 2001). The major drivers of land-use change are political, economic, demographic and possibly cultural factors (e.g. Antrop, 2000). For the consequences at both local and regional level, the spatial patterns of land-use changes are therefore as relevant as the aggregate amount of change (Verburg *et al.*, 2004). Based on these premises, there is a definite need to integrate spatio-temporal approaches to land-use

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science and permanent monitoring tools addressing the specificity of economically-dynamic suburban areas (Hasse and Lathrop, 2003).

Urban development can be conceived as a self-organising system in which natural constraints and institutional controls (e.g. through land-use policies) influence the way in which local decision-making processes modulate forms and socioeconomic structures of large urban regions (Krueger and Savage, 2007). Physical, ecological and socioeconomic processes create, maintain and destroy spatial patterns and, at the same time, spatial patterns facilitate, inhibit, or neutralize these processes (Zhang *et al.*, 2004). Urbanization is a striking form of irreversible land transformation affecting landscapes as well as people who live in and around cities (Luck and Wu, 2002; Aguilera *et al.*, 2011).

A main issue in land-use studies is to enhance the decision makers' understanding of the future urban patterns by providing perceptions of several possible scenarios against which decisions can be tested. For example, to achieve a more balanced socioeconomic development, local authorities need tools to monitor how the land is managed sustainably (Bouma *et al.*, 1998; Kumar Jat *et al.*, 2008). The competitiveness of urban regions can be lowered by unsustainable land management strategies because the potentialities of development can be deeply altered by ignoring potential conflicts in the use of land. Urban systems should be therefore studied as integrated landscapes in which context and spatial relations are important as both entities and processes (Zhang *et al.*, 2004).

Most European cities kept their historical compact structure, being characterized by a dense historical core and a relatively small fringe surrounded by rural areas until the 1950s, when the economic growth caused the expansion outside of the inner city. Nowadays, urban sprawl is a common phenomenon throughout Europe and is expected to continue during the upcoming decades (Dieleman and Wegener, 2004; European Environment Agency, 2006; Kasanko *et al.*, 2006; UNEP, 2010).

Salvati *et al.* (2013) hypothesized the existence of an homologation process influencing together composition, structure and spatial configuration of peri-urban landscapes due to the effect of diffused urban expansion in the originally compact, large city regions of the Mediterranean basin. This process may reduce the importance of the biophysical and socioeconomic factors which determined the traditional structure of the Mediterranean landscape with the well defined segregation in the anthropogenic, agricultural and natural land-use classes observed along the urban gradient (Brouwer *et al.*, 1991). These changes may have important implications on landscape diversity, heterogeneity and, possibly, long-term resilience to environmental shocks. Unfortunately, despite the mass of papers devoted to study urban sprawl and land-use changes in peri-urban areas, this hypothesis was never tested explicitly in the Mediterranean region.

While sprawl processes have been widely investigated with the use of the 'population density vs distance' curve applied to the study of environmental, demographic and socioeconomic trends observed along the urban gradient

(Alberti, 2005), indicators of landscape configuration and structures, to the best of our knowledge, were never tested for mono-centricity in originally compact cities. The mono-centric model introduced by urban economics (O'Sullivan, 2002), results particularly useful in predicting long-term changes in a spatial configuration and provides evidence on the variation in steepness of the variable being considered, becoming more uniform throughout the distance from the city centre, produced by suburbanization. Furthermore, few studies have taken into account the suburban areas associated with urban expansion together with a landscape perspective (Cakir *et al.*, 2008; Catalàn *et al.*, 2008; Solon, 2009).

In the present study changes in land-use patterns along the urban gradient have been analyzed in Rome, Italy, during 60 years after World War II with the aim of testing if landscape structure, based on two simple class metrics (average patch size and shape index), follows the predictions of the mono-centric model. Urban planning and decision-making for sustainable development urgently need high-resolution data to establish the relationship between the socioeconomic performances of urban systems and their environmental impacts (Pauleit and Duhme, 2000; Zhang *et al.*, 2004). Rome is a Mediterranean city with a fairly increasing population and a tertiary-oriented economy (Mudu, 2006; Munafò *et al.*, 2010) experiencing, especially in the last years, low-density expansion at the fringe. Rome has been traditionally proposed as a model for urban concentration and economic polarization while, in the last years, planning was guiding the city towards a polycentric growth (OECD, 2006). Rome's suburban landscape is threatened by typical patterns of change characterizing sprawling cities, such as cost of urban services because of the distance between new settlements and the city centre (Burchell *et al.*, 2002), increased travel and congestion (Ewing *et al.*, 2003), increased volumes of water runoff (Stone and Bullen, 2006), loss of prime agricultural lands (Heimlich and Anderson, 2001), soil contamination and sealing (Stone, 2008). By linking a quantitative analysis of landscape patterns with a narrative approach describing the recent planning strategy developed by Rome's municipality, the present study discusses on the role of landscape monitoring to inform policies for urban containment and sustainable land management.

2. METHODOLOGY

2.1. Study Area

The investigated area (1,500 km²) encompasses the boundaries of Rome's municipality (central Italy) and is characterized by homogeneous soils and climate; land topography consists of 90% lowlands and 10% uplands. In the early 1990s the area was subdivided in two municipalities (Rome: 1,285 km² and Fiumicino: 215 km²). Half of the studied area still consists of forests,

pastures, and high-quality cropland forming the traditional landscape of the 'Agro Romano' lowland surrounding Rome (Munafò *et al.*, 2010). More than 27% of Rome's municipality surface area (nearly 410 km²) is actually under land conservation measures (regional parks and natural reserves).

2.2. Land-Use Data

Land-use data were obtained from the elaboration of two compatible digital maps classified according to the Corine Land Cover classification system: the Italian Istituto Geografico Militare topographic map scaled 1: 25,000 and produced in 1949 and an original land-use map (scaled 1: 25,000) derived from photo-interpretation of digital ortho-images released from the Italian National Geoportal related to 2008. A nomenclature including nine homogeneous classes with a minimum mapping unit of 1 hectare has been selected as follows: (i) arable land, (ii) mixed cropland, (iii) vineyards, (iv) olive groves, (v) woodland, (vi) pastures, (vii) urban gardens, (viii) wetlands and (ix) built-up areas. The produced land-use figures have been checked for consistency with independent statistical (e.g. agricultural and building censuses) and cartographic data (Salvati *et al.*, 2013). In 2008, two classes of built-up areas were also identified (continuous urban fabric and discontinuous settlements) and used in the subsequent analysis.

2.3. Spatial Analysis

A transition matrix was calculated by class to study land-use changes observed during the investigated time period. The annual rate of change observed for each land-use class was further calculated. The share of unchanged surface area was calculated for each class by dividing the area classified at the same use in 1949 and 2008 to the total class area in 1949. The distance of the centroid of each landscape patch from a central place in Rome (Piazza Barberini) was calculated and averaged by year and class. To assess the impact of compact and dispersed urbanization on land-use changes in Rome, the proportion of land consumed over 1949–2008 by continuous urban fabric and discontinuous settlements was calculated for each class. Non-parametric statistics (Mann-Whitney U test and Spearman Rank Correlation test) were used to compare the distribution of landscape indicators between years and to correlate them pair-wise.

Previous studies propose landscape metrics to detect spatial patterns caused by urbanization (Luck and Wu, 2002; Verburg *et al.*, 2004; Zhang *et al.*, 2004, 2007). In the present study, the choice of variables, the procedure for the construction of indicators, and the identification of the thematic dimensions adequate to assess landscape characteristics (e.g. composition, structure, spatial

distribution and configuration) at the regional level have been set up according to general criteria of comprehensiveness, reliability, and easiness in calculation. As far as landscape metrics, two well-known and simplified indexes have been calculated at the class level (patch size and shape index or area-to-perimeter ratio) with the aim of being used also by local stakeholders and planners not confident with spatial analysis and geographic information systems tools (Uuemaa *et al.*, 2009). Metrics were obtained by using ArcGIS 9.3 software (ESRI Inc., Redwoods, USA) through computation on 1949 and 2008 land-use maps. The two indicators selected provide a broad qualification of land-use composition, landscape characteristics and urban expansion (with special focus on dispersed and discontinuous settlements) observed in the investigated area. Using the distance of each patch from the inner city measured in 1949 and 2008, average metrics have been calculated for five concentric rings with (i) < 2 km further away from the centre of Rome, (ii) 2–5 km, (iii) 5–10 km, (iv) 10–20 km and (v) > 20 km. Finally, the pair-wise correlation of the two metrics with the distance of each patch from the inner city was calculated by year using the non-parametric Spearman rank statistic testing at $p < 0.05$ after Bonferroni's correction for multiple comparisons.

3. RESULTS

3.1. Changes in Landscape Composition and Structure in Rome

A change detection analysis based on transition matrices between 1949 and 2008 by class allows identifying some important changes in the landscape composition and structure (figure 1). Modifications in the class area along the urban-to-rural gradient were analyzed together with the average distance from the inner city where these changes occurred (table 1). The most significant change was found in the transformation of arable land towards built-up areas (17.4% observed at an average distance of 19 km from the inner city) and forests (3.6% at 12.9 km).

Only 2.2% of forests were transformed into arable land at an average distance of 16 km from the city centre, 0.9% into built-up areas at 15.6 km and 0.8% into pastures at 17 km. Crop mosaic has been transformed by 0.7% into arable land at 15.7 km and by 0.5% into built-up areas at 11.1 km. Olive groves were converted into arable land by 0.2% at an average distance of 18 km. Pastures were transformed respectively into arable land (2%) and built-up areas (1.7%) at 16.4 km and 14.2 km, on average. Forests invaded 0.7% of pastures at 17 km and vineyards turned by 0.7% into arable land and built-up areas respectively at 18.5 and 16.4 km.

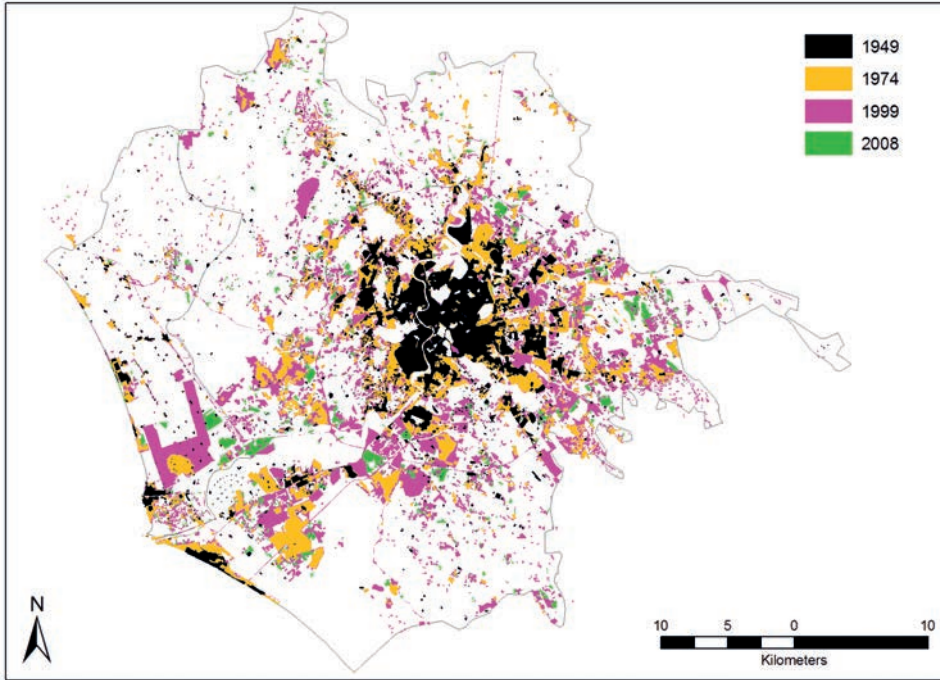


Fig. 1. A map of the study area illustrating the expansion of urban settlements between 1949 and 2008
Source: authors' elaboration

Table 1. Landscape transition matrices between 1949 and 2008 by land-use class (highlighted cells indicate stable uses of land: (a) percent class area, (b) average distance from the inner city

(a)

Class	Water bodies	Forests	Crop mosaic	Olive groves	Urban parks	Pastures	Arable land	Built-up areas	Vineyards	Total 2008
Water bodies	0.7	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.7
Forests	0.0	7.1	0.2	0.0	0.0	0.7	3.6	0.1	0.0	11.9
Crop mosaic	0.0	0.1	0.1	0.1	0.0	0.1	1.6	0.0	0.1	2.1
Olive groves	0.0	0.1	0.1	0.1	0.0	0.1	0.7	0.0	0.2	1.2
Urban parks	0.0	0.1	0.1	0.0	1.1	0.3	1.5	0.3	0.0	3.3
Pastures	0.0	0.8	0.1	0.0	0.0	1.2	5.5	0.2	0.1	8.0
Arable land	0.0	2.2	0.7	0.2	0.0	2.0	38.0	0.3	0.7	44.1

Class	Water bodies	Forests	Crop mosaic	Olive groves	Urban parks	Pastures	Arable land	Built-up areas	Vineyards	Total 2008
Built-up areas	0.0	0.9	0.5	0.0	0.4	1.7	17.4	5.7	0.7	27.5
Vineyards	0.0	0.0	0.0	0.1	0.0	0.0	0.7	0.0	0.5	1.3
Total 1949	0.7	11.2	1.8	0.4	1.6	6.1	69.2	6.6	2.4	100.0

(b)

Class	Water bodies	Forests	Crop mosaic	Olive groves	Urban parks	Pastures	Arable land	Built-up areas	Vineyards	Average 2008
Water bodies	13.3	24.1	23.2	16.3	4.9	15.1	13.1	11.3	–	13.8
Forests	13.0	17.2	17.2	18.5	13.2	17.0	15.6	12.9	20.4	16.3
Crop mosaic	13.0	17.8	17.0	20.8	5.8	16.1	17.3	11.3	19.9	17.0
Olive groves	–	16.9	16.8	17.1	9.1	15.8	17.1	13.6	18.3	16.9
Urban parks	7.0	14.2	8.3	23.0	6.6	10.9	10.4	7.4	13.8	9.3
Pastures	12.0	17.3	12.9	16.4	11.2	15.9	14.7	11.8	16.3	15.0
Arable land	15.1	16.4	15.7	18.1	10.9	16.4	15.5	14.5	18.5	15.8
Built-up areas	15.6	15.6	11.1	17.8	6.1	14.2	13.5	10.3	16.4	12.9
Vineyards	–	19.6	21.3	19.4	19.0	20.4	19.0	15.1	18.4	19.1
Average 1949	13.5	16.7	13.5	18.1	7.1	15.3	14.6	11.1	17.5	14.5

Source: authors' elaboration.

3.2. Urbanization-Driven Landscape Changes

A scatterplot representing changes in the percent class area and average distance from Rome by land-use class between 1949 and 2008 (figure 2a) identified three main categories: (1) natural or semi-natural classes (forests, pastures and water bodies) showing moderate changes in both variables, (2) agricultural classes (vineyards, arable land and crop mosaic), characterized by a stable or weakly decreasing class area and a marked increase in the average distance from the inner city, and (3) anthropogenic classes (continuous and discontinuous built-up areas, urban parks and gardens) with a rapid growth in class area and a moderate increase in the average distance from the inner city. Olive groves showed a moderate increase in class area with a modest decrease in the average distance from Rome.

A scatterplot showing the differences in the average distance from Rome between unchanged patches during 1949–2008 and total land in 1949 and the class percentage of unchanged land (1949–2008) on 1949 class area (figure 2b) identified three

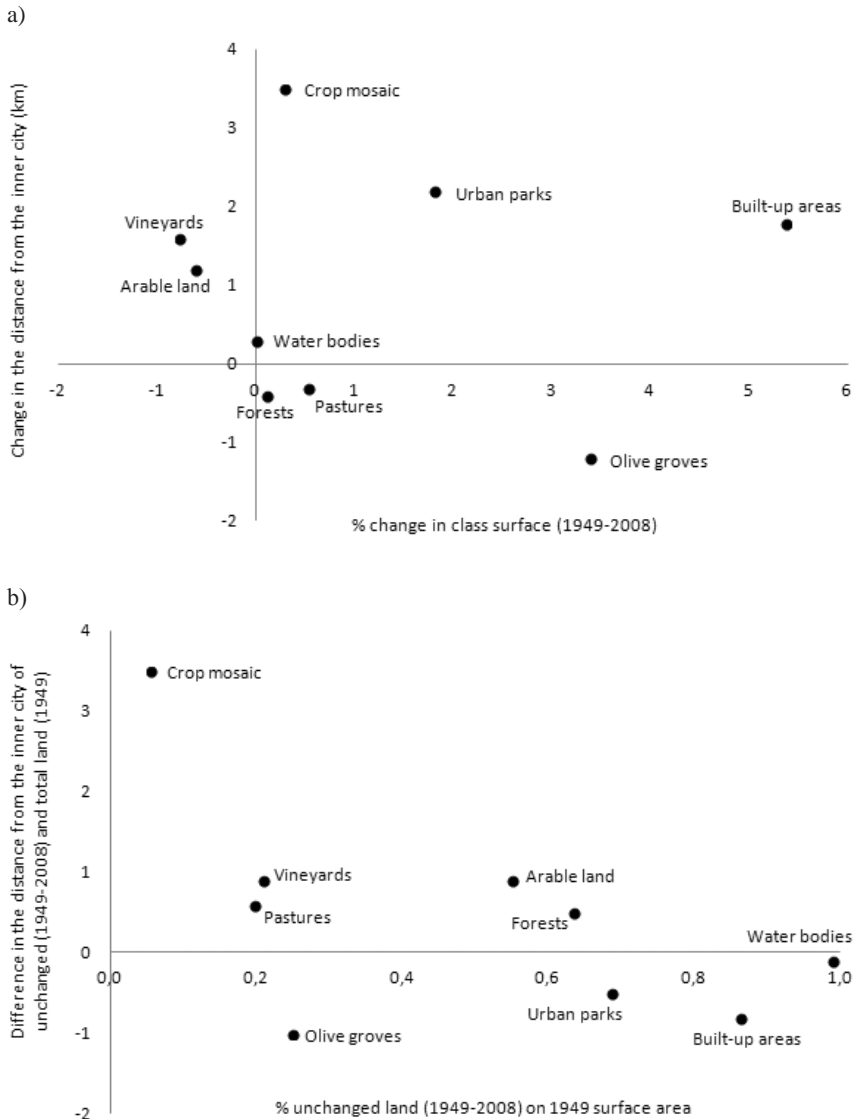


Fig. 2. Scatterplots illustrating (a) changes in percent class area and average distance from Rome by class of land-use between 1949 and 2008 and (b) difference in the average distance from Rome of unchanged (1949–2008) and total land (1949) and percentage of unchanged land (1949–2008) on 1949 surface area by class of land-use

Source: authors' elaboration

classes whose average distance from Rome decreased over time (built-up areas, urban parks and olive groves) from the remaining natural and agricultural classes which experienced a progressive decline. The percentage of unchanged land during the investigated period is a class-dependent attribute of the landscape which was not influenced by the initial class area (Spearman Rank test, $p > 0.05$, $n = 9$). By contrast, the class percentage of unchanged land showed a negative correlation with the distance from the inner city (Spearman Rank test, $p < 0.01$, $n = 9$) and changes in the class average distance observed during 1949–2008 are negatively correlated with the class average distance observed in 1949 (Spearman Rank test, $p < 0.05$, $n = 9$).

Moreover, the analysis of land-use changes allows defining the typology of urbanization (i.e. continuous or discontinuous) causing landscape transformations between 1949 and 2008 (figure 3). Woodlands were converted mostly into discontinuous

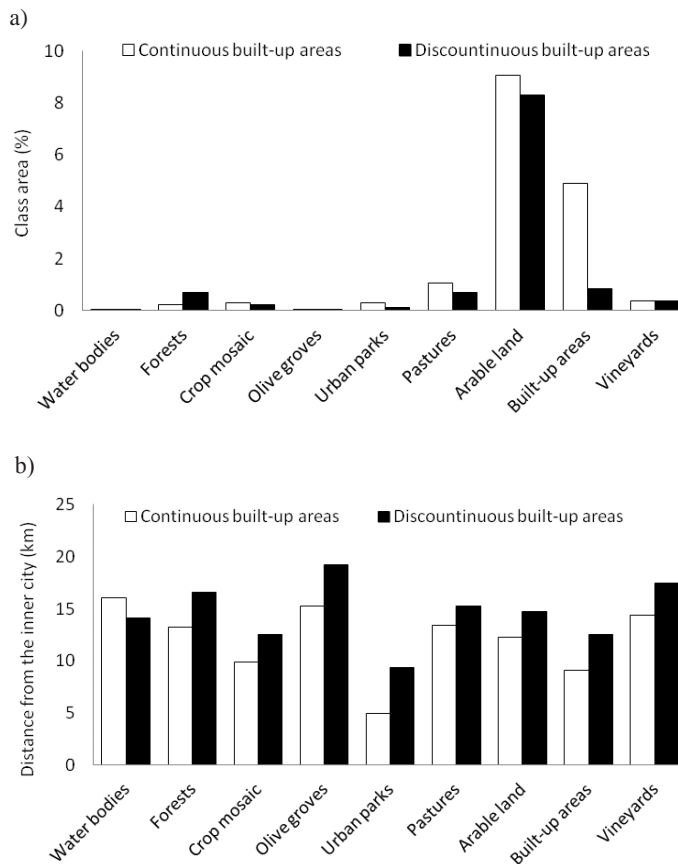


Fig. 3. Typology of urbanization (continuous or discontinuous settlements) derived from the landscape transformations observed between 1949 and 2008: (a) percentage of transformed land, (b) average distance of transformed land from Rome (km)

Source: authors' elaboration

settlements at greater distances from the city centre compared with the other land-use classes. For crop mosaic, pastures, arable land and green urban parks, land converted into continuous settlements was observed at a lower distance than patches transformed into discontinuous settlements. Vineyards were converted into continuous settlements at smaller distance from the inner city compared with discontinuous settlements. With the exception of forests and vineyards, land consumed by continuous settlements was always greater than that consumed by discontinuous settlements although with different proportions observed for each class. Overall, discontinuous settlements were found at significantly greater distances from the centre of the city than the continuous settlements (Mann-Whitney U test, $p < 0.01$, $n = 9$).

3.3. Patch Size

The average patch size greatly varied in each examined class between 1949 and 2008 (table 2). A marked increase in both forest and built-up patch size has been observed over time.

Table 2. Average patch size and shape index in Rome by class and year

Distance	Forests	Pastures	Crop mosaic	Olive groves	Vineyards	Arable land	Built-up areas	Urban parks	Total
<i>Average patch size (km²)</i>									
1949									
0–2	–	0.01	–	–	–	–	1.65	0.22	0.64
2–5	0.05	0.18	0.02	–	–	0.36	0.22	0.21	0.22
5–10	0.05	0.14	0.05	0.04	0.03	1.13	0.05	0.12	0.13
10–20	0.13	0.29	0.12	0.08	0.20	5.51	0.02	0.74	0.59
20–40	0.48	0.44	0.15	0.16	0.16	1.89	0.03	0.19	0.35
Total	0.19	0.27	0.09	0.11	0.15	3.16	0.06	0.20	0.37
2008									
0–2	–	–	–	–	–	–	0.03	0.34	0.31
2–5	0.18	0.18	0.15	–	–	0.08	3.12	0.26	0.98
5–10	0.11	0.15	0.07	0.04	0.02	0.36	0.41	0.09	0.23
10–20	0.13	0.08	0.05	0.03	0.10	1.22	0.12	0.08	0.22
20–40	0.55	0.08	0.06	0.05	0.06	0.68	0.10	0.05	0.19
Total	0.22	0.10	0.06	0.04	0.09	0.94	0.21	0.11	0.23

Distance	Forests	Pastures	Crop mosaic	Olive groves	Vineyards	Arable land	Built-up areas	Urban parks	Total
<i>Shape index (Area to perimeter ratio)</i>									
1949									
0–2	–	0.008	–	–	–	–	0.093	0.075	0.067
2–5	0.023	0.051	0.025	–	–	0.068	0.053	0.059	0.055
5–10	0.030	0.051	0.034	0.037	0.033	0.075	0.026	0.061	0.034
10–20	0.032	0.061	0.048	0.051	0.044	0.089	0.025	0.116	0.039
20–40	0.068	0.080	0.053	0.067	0.042	0.098	0.027	0.064	0.052
Total	0.039	0.061	0.041	0.056	0.041	0.085	0.028	0.064	0.041
2008									
0–2	–	–	–	–	–	–	0.032	0.064	0.061
2–5	0.026	0.044	0.041	–	–	0.053	0.066	0.052	0.051
5–10	0.027	0.038	0.044	0.034	0.029	0.050	0.052	0.042	0.043
10–20	0.025	0.033	0.035	0.028	0.035	0.046	0.040	0.041	0.036
20–40	0.034	0.032	0.035	0.031	0.034	0.054	0.033	0.036	0.035
Total	0.027	0.033	0.036	0.029	0.035	0.049	0.041	0.043	0.037

Source: authors' elaboration.

Overall, forests increased by 15.8% with a maximum growth in the 2–5 km distance class, while they remained substantially unchanged in the 10–20 km class. Despite a decrease in the range 0–2 km, the remaining distance classes are characterized by expanding built-up areas, with a maximum increase in patch size observed in the range 2–5 km. Arable land is the class showing the highest decline in patch size (by more than 70%), with a maximum decrease observed in the 2–5 and 10–20 km classes. Overall, olive grove average patch size decreased by 63% being stable only in the 5–10 km class; the highest decline (68.7%) was observed in the range 20–40 km. The average patch size of pastures decreased by 62%: between 1949 and 2008 pastures disappeared in the range 0–2 km and a decrease by more than 70% was observed between 10 and 40 km. Interestingly, the average patch size remained quite stable in the range 2–10 km. Overall, urban parks decreased by 45%, with a reduction of 89% between 10 and 20 km from the city centre. Only in the 2–5 km range a marked increase (+54%) was observed. Vineyards average patch size decreased by 40% from 15 to 9 ha with a considerable decline (–90%) in the 20–40 km range. Crop mosaic

is the class with the lowest variation in patch size over time (−33%). However, while crop mosaic between 2 and 10 km increased slightly, a decrease up to 60% has been observed at greater distances from the inner city.

3.4. Shape Index

The shape index substantially varied along the urban gradient in almost every land-use classes, with the exception of built-up areas, for which the shape index increases by 46%, with the maximum increase observed in the range 5–10 km, while declining in the first distance class (table 2). For olive groves, the average shape index decreased by 48% declining gradually with the distance from the inner city. Pastures showed a decrease by 46% in the shape index, which declined with the distance, until 60% on the 20–40 km distance class. The shape index for arable land decreased by 42%, with the maximum variation observed in the 10–20 km range. Urban park shape index decreased by 33% especially in the 10–20 km distance class. Forests showed a decrease by 30% in the shape index by increasing only in the 2–5 km class, while declining with the distance from the inner city. The shape index for vineyards declined by 14%, with a maximum decrease observed in the 10–20 km distance class. Crop mosaic showed less fragmentation, with the shape index declining by 12%.

3.5. Changes in Landscape Configuration along the Urban Gradient

According to the results mentioned above, landscape structure diverged in 1949 and 2008 according to the distance from the inner city (table 2). In the 0–2 km distance class, pastures disappeared and built-up areas decreased by 98%. An increase by 54% in urban parks was observed and overall patch fragmentation grew up by 15%. In the range 2–5 km, a significant increase in built-up areas, crop mosaic and forests was observed, with arable land decreasing by 77%. Forests, crop mosaic and built-up areas showed a higher shape index, while pastures, arable land and urban parks showed increasing patchiness and morphological complexity. In the 5–10 km distance class, a large expansion in patch size was observed for built-up areas, forests and crop mosaic, while average patch size decreased for vineyards (−33%), urban green areas (−25%) and arable land (−68%). The shape index increased for built-up areas (100%) and crop mosaic (29%) while decreasing for the other classes: this indicates a more fragmented landscape structure in peri-urban areas.

Important differences were found in the pair-wise correlation between the distance from the inner city and patch size (or shape index) during the investigated period (table 3).

In 1949 the average patch size increased with the distance from the inner city, while shapes remain relatively homogeneous in the case for forests, pastures and crop mosaic. A decline in class area was observed for pastures and crop mosaic

in 2008 together with land fragmentation while forests experienced fragmentation together with a drastic increase in class area. The shape index for arable land, built-up areas and urban parks declined with the distance from the inner city indicating higher fragmentation. Notably, in 2008 the decrease of patch size and shape index along the urban gradient was found higher for built-up areas and urban parks.

Table 3. Spearman rank correlation test between the distance from the inner city and (a) patch size or (b) shape index in Rome by class and year (bold indicates significance at $p < 0.01$)

Class	(a) Patch size		(b) Shape index	
	1949	2008	1949	2008
Forests	0.22	0.04	0.17	0.05
Pastures	0.16	-0.17	0.14	-0.13
Crop mosaic	0.12	-0.13	0.17	-0.14
Olive groves	0.23	-0.04	0.23	-0.07
Vineyards	-0.09	0.00	-0.09	-0.02
Arable land	-0.09	-0.11	-0.07	-0.08
Built-up areas	0.00	-0.29	0.03	-0.33
Urban parks	0.11	-0.29	0.16	-0.24

Source: authors' elaboration.

4. DISCUSSION

Rapid and conflicting transformations in land-use are shaping urban and peri-urban landscapes in the last years: the demand for building land is becoming increasingly acute and the deterioration of urban centres due to traffic congestion, lack of green and open spaces, air pollution and socioeconomic matters together with drastic changes in the real estate market are playing a crucial role in intensifying sprawl processes (Bruegmann, 2005). Just to provide an example relative to Europe, the inhabitants of urban areas have passed, in 2008, the resident population living in rural areas and more than 80% of Europeans will be living in urban areas by 2030 (United Nations, 2006). Over the past 50 years, we assisted to a growth of cities characterized by mainly discontinuous settlements, defined by the European Environment Agency (2006) as the physical pattern of low-density expansion of large urban areas, under market conditions, into the surrounding agricultural areas, supported by the dependence of the population of its private car and of its preference for one-family-housing. The implications of

this kind of development include traffic and increasing demand for mobility (Ewing *et al.*, 2003; Cameron *et al.*, 2004; Kahn, 2000), land-use fragmentation and loss of biodiversity (Alberti, 2005), reduced landscape attractiveness (Sullivan and Lovell, 2006) and alterations of the hydrological cycle and flooding regimes (Carlson, 2004). Moreover, urbanization-driven land-use change is one of the main causes of political and social conflicts at various scales (Plotkin, 1987).

As underlined in recent studies, urban sprawl in the Mediterranean region is determining a transition from a polarized landscape in urban and rural areas towards a diffused and mixed pattern of urban and peri-urban areas that spreads over the available land consuming both agricultural and semi-natural areas with important ecological implications (Dieleman and Wegener, 2004; European Environment Agency, 2006; Salvati *et al.*, 2012). By comparing the land-use structure observed in Rome in 1949 and 2008, the present study has shown a trend towards fragmentation of both agricultural and forest land-use classes driven by low-density dispersed urbanization together with a spatial rearrangement of land-use classes whose distribution appears less associated with the distance from the inner city than it was in the past.

With built-up areas increasing along the urban gradient, results show a significant rate of edification for arable land. Moreover, a decrease in class area with greater fragmentation was observed for agricultural areas as a whole. While continuous settlements mainly consumed agricultural and pasture land, which are the most available and suitable cover type to building (Kasanko *et al.*, 2006), discontinuous built-up areas derived mostly from the conversion of forests at a progressively greater distance from the inner city. Forests are moderately increasing in almost every distance classes possibly due to the abandonment of arable land and pastures, but they show a greater fragmentation compared to the past. Forest fragmentation may indicate an increasing environmental fragility, because large and intrinsically-connected forest patches have a critical role in providing habitat and sustaining ecosystem functions (Christian *et al.*, 1998; Lindenmayer *et al.*, 1999).

With the exception of built-up areas and forests, the other classes (pastures, crop mosaic, olive groves, vineyards and arable land) showed a decrease with fragmentation mostly at higher distances from the inner city. While in 1949 the average patch size of agricultural land-uses increased with the distance from the inner city, cultivated land in 2008 showed a significant reduction in the class area and fragmentation at higher distances from Rome. These results confirm the assumptions of the mono-centric model and point out the environmental implications of land fragmentation in terms of landscape resilience, soil degradation and biodiversity loss (Baker *et al.*, 2001; McIntyre *et al.*, 2001). The conservation of peri-urban agriculture is an indirect measure for biodiversity conservation, soil resources preservation and maintenance of high level of human wellbeing. Moreover, Rome is the largest rural municipality in Italy (ISTAT, 2009): in such a context, the conservation of ecological corridors is fundamental to mitigate the ecological consequences of urban sprawl (Blasi *et al.*, 2001).

Table 4 summarizes the results obtained in the present study in the light of mono-centric model's assumptions. While in 1949 three and six land-use classes followed the prediction of the mono-centric model respectively for average patch size and mean shape index, in 2008 this number reduced to 1 and 2. Interestingly, the shape index of built-up areas followed the mono-centric model in 1949 only, suggesting that landscape configuration in 2008 became more mixed and interspersed due to diffused settlement expansion. The same trend was observed for forests, crop mosaic and olive groves following a mono-centric pattern in 1949 and a mixed one in 2008. Only pastures showed a mono-centric behaviour in 2008 for both metrics. The landscape complexity described above, coupled with a multifaceted system of territorial actors and functions, makes the strategies to containing sprawl and land consumption partly ineffective (Gemmiti *et al.*, 2012).

Table 4. A synopsis table for assessing the mono-centric model in Rome by class, metrics and year (summary results from tables 1 and 2; +: continuously increasing with distance; – = continuously decreasing with distance; m = mixed trend)

Class	Patch size		Shape index	
	1949	2008	1949	2008
Forests	+	m	+	m
Crop mosaic	+	m	+	m
Olive groves	+	m	+	m
Urban parks	m	m	m	–
Pastures	m	–	+	–
Arable land	m	m	+	m
Built-up areas	m	m	–	m
Vineyards	m	m	m	m

Source: authors' elaboration.

Rome's development after World War II was driven by policies supporting traditional tertiary sectors and depressing the industrial growth (Costa *et al.*, 1991; Krumholtz, 1992; Insolera, 1993; Fratini, 2000). Rome's municipality (1,285 km²: one of the largest in Europe) was subdivided into nineteen districts with a population similar to many middle-size Italian cities (i.e. 100,000–200,000 inhabitants) and endorsed with restricted governance functions. Due to policy fragmentation at the regional scale, excessive bureaucracy and planning

centralization in a municipality administering an unusually large area, Rome was neither faced by an efficient local governance system, nor by effective forms of territorial cooperation that could be seen as an expression of polycentrism, competitiveness and sustainability (e.g. Tewdwr-Jones and McNeill, 2000; Feiock, 2004). In fact, the capacity of local authorities in developing sustainable land management strategies was limited by the institutional framework.

5. CONCLUSIONS

Urbanization is not only a physical characteristic of the landscape but reflects also cultural and social changes caused by transformation of rural life styles into urban like ones, changing the vision people have about their environment and the way they use it (Antrop, 2000). The increasing landscape fragmentation, like in the case of Rome, produces a loss of rural attributes that constituted the identity of a territory with specific values and traditions. Consequently, people do not have a sense of belonging to the area and this results also in declining social cohesion and environmental awareness. Sustainable land management should contribute to the preservation of the relict patches of green and agricultural areas by encouraging self-contained urban growth and containing land fragmentation.

Sustainable land management should contribute to the preservation of the relict patches of forest and agricultural areas on the fringe by stimulating self-contained urban growth and mitigating habitat fragmentation. Urban voids and abandoned brown-field sites are signals of landscape deterioration and confirm, in some cases, the low effectiveness of land protection policies and planning prescriptions. In some European countries, land-use plans prescribe the design of greenbelts seen as physical boundaries separating urban and rural areas. In many cases, greenbelts have proved to be effective in the containment of sprawl (Bengston and Youn, 2006). However, most of those policy strategies – when applied – have revealed only partly effective in northern Mediterranean cities because of the lack of explicit goals (Bengston *et al.*, 2004; Koomen *et al.*, 2008; Salvati *et al.*, 2013). Nevertheless their application demonstrates the importance of strategies considering a ‘building zone’ opposed to a rural area inside urban municipalities (Gennaio *et al.*, 2009). Such an institutional control on building activity could be a crucial point in the case of large Mediterranean cities (Giannakourou, 2005) where illegal building or isolated properties often make place to new built-up areas.

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STATUS REPORT ABOUT THE PROGRESS OF THE VISEGRAD COUNTRIES IN RELATION TO EUROPE 2020 TARGETS

1. INTRODUCTION

In this study we intended to review some aspects of one of the most significant cooperations in Central and Eastern Europe, namely the Visegrad cooperation. It has been a very important economic, social and political collaboration of the four countries (Poland, Slovakia, Czech Republic and Hungary) for long. The basic principle in the cooperation has always been to strengthen the links among the abovementioned countries, and due to the EU funds available, it has received greater importance even 10 years after their accession to the European Union. Based on the historical links and geographical proximity, we believe that the Visegrad group should find common ways of development even if their development level is not the same. It is important to find out whether the Visegrad countries could get closer to the targets defined by the European Commission by now or they need further improvements in some of the fields.

2. LITERATURE REVIEW

2.1. Visegrad Group

The Czech Republic, Hungary, Poland and Slovakia, also known as the Visegrad Group countries, have long shared common ground in history, culture, religion, and economics. Over the centuries this shared past has been marked by a striving

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for unity as well as frequent frictions, peaceful times and military conflicts. The name of the cooperation refers to the historical meeting of 1335 in the royal palace of Visegrad, where Hungarian, Czech and Polish kings took strategic decisions for political and commercial purposes in order to strengthen the role of the region. On 15 February 1991, the renewed Visegrad Cooperation was set up with the aim of supporting the three post-socialist Central and Eastern European countries' (Hungary, Czechoslovakia and Poland) Euro-Atlantic integration. (The V4 configuration was formed in 1993 following the dissolution of Czechoslovakia and the establishment of the independent Czech and Slovak Republics) – Visegrad Declaration. The Visegrad Group represents a consistent geographical region on the Eastern border of the European Union. This makes the region strategically important and also creates opportunities for the group's member states to utilise their partnership at the regional level as well as within the European Union, though they often regard each other as competitors rather than friends, even after 25 years of systemic changes (Rácz, 2009). After the EU accession, their cooperation has got even more importance than earlier. It is known that the former EU countries are in a far better economic and social situation so the Visegrad Group does not only need to catch up with them but it must find ways how to represent common interest as a group and how to achieve higher cohesion in V4 and in the CEE region. The countries have to define their own endogenous strategies how to achieve economic cohesion and they also need to work on finding new ways for mutual benefits. Common goals are laid down in the New Visegrad Declaration signed by the Prime Ministers of the four countries on 12 May 2004 in Kroměříž, Czech Republic. Under the declaration it was undertaken that in the future, the V4 endeavour to take advantage of the opportunities opened up by joint actions in a pragmatic way, focusing on the common interests, free of illusions (Rácz, 2009). Since it is clear that there are some regions, e.g. Prague which does not belong to the regions lagging behind as most of the regions in the CEE region, it is a challenge how to carry out joint actions which are beneficial for all the Visegrad countries. It is also a fact that the development level of the countries has changed in the past 10 years due to the different progress in development and e.g. Hungary, which used to be one of the developed countries of the region, now is at the bottom of the line. It means that the countries need to face not only national challenges but need to find ways of real collaboration as well as need to be able to meet the targets set in European Union strategies, like Lisbon strategy or EUROPE 2020.

2.2. Lisbon Strategy

The original Lisbon strategy was launched in 2000 as a response to the challenges of globalisation and ageing. The European Council defined the objective of the strategy for the EU 'to become the most dynamic and competitive knowledge-based economy in the world by 2010 capable of sustainable economic growth

with more and better jobs and greater social cohesion and respect for the environment'. Underlying this was the realisation that, in order to enhance its standard of living and sustain its unique social model, the EU needed to increase its productivity and competitiveness in the face of ever fiercer global competition, technological change and an ageing population. It was recognized that the reform agenda could not be pursued at EU level alone (as had for instance been the case with the 1992 single market programme), but that since many of the policy areas involved member state competences, close cooperation between the EU and member states would be necessary to achieve results. It also reflected a first acknowledgement that member states' economies are inherently linked, and that the action (or inaction) of one member state could have significant consequences for the EU as a whole. However, the original strategy gradually developed into an overly complex structure with multiple goals and actions and an unclear division of responsibilities and tasks, particularly between the EU and national levels. The Lisbon strategy was therefore re-launched in 2005 following a mid-term review. In order to provide a greater sense of prioritisation, the relaunched strategy was focused on growth and jobs. A new governance structure based on a partnership approach between the Member States and the EU institutions was put into place. In assessing ten years of the Lisbon strategy, what ultimately counts is the impact on growth and jobs. Assessing this impact, however, is not straightforward, as the economic cycle and external events, as well as public policies, play a determining role. Ultimately, the objective of the Lisbon strategy was to improve the pace and quality of reforms at national and European level: therefore the assessment needs also to consider whether the strategy shaped reform agendas by forging greater consensus amongst stakeholders on challenges and policy responses (SEC, 2010).

Overall, the Lisbon strategy has had a positive impact on the EU even though its main targets (i.e. 70% employment rate, and 3% of GDP spent on R&D) have not been reached. The EU employment rate reached 66% in 2008 (from 62% in 2000) before it dropped back again as a result of the crisis. However the EU has failed to close the productivity growth gap with leading industrialized countries: total R&D expenditure in the EU expressed as a percentage of GDP only improved marginally (from 1.82% in 2000 to 1.9% in 2008). It would, however, be too simplistic to conclude that the strategy has failed because these targets were not met. We can state that the strategy has broken new ground by promoting common actions to address the EU's key long-term challenges (SEC, 2010).

2.3. Europe 2020

As a sort of continuation of the sustainable development measures taken in the framework of the Lisbon strategy, and to achieve the goals which could not be met by 2010, the EU published another strategy in 2010, namely EUROPE 2020, to

enhance the sustainable economic and social cohesion among the member states. EUROPE 2020 was being developed and was in the finalisation phase when the global financial crisis hit the world, including the EU. Thus, the European Commission had to define strategies which continue the activities of the Lisbon strategy, as well as to define totally new ones to meet the changed conditions due to the financial crisis and also to set long-term objectives to achieve further convergence within the Union. It is the first global strategy in the EU aiming at economic and social development in long-terms, considering sustainable aspects. It has been in effect since 1 January 2011, therefore all the development projects, carried out or to be carried out in the territory of the EU in the near future, have to meet the requirements of the abovementioned strategy. It is also a well-known fact that the member states are in different stages of development and there are great differences in meeting the EUROPE 2020 target indicators.

EUROPE 2020 focuses on three key priorities:

- *smart growth*: developing an economy based on knowledge and innovation
- *sustainable growth*: promoting a more resource efficient, greener and more competitive economy
- *inclusive growth*: fostering a high-employment economy delivering economic, social and territorial cohesion.

The headline targets related to the strategy's key objectives at the EU level, as defined in the Council Conclusions, are:

- 75% of men and women aged 20 to 64 years to be employed;
- 3% of GDP to be invested in the research and development (R&D) sector.

Climate change and energy targets:

- reduce greenhouse gas emissions by 20% compared to 1990 levels;
- increase the share of renewables in final energy consumption to 20%;
- 20% increase in energy efficiency;
- reduce the rates of early school leaving to below 10%, and at least 40% of 30 to 34 year olds to have completed tertiary or equivalent education;
- reduce poverty by lifting at least 20 million people out of the risk of poverty or social exclusion (Eurostat, 2013).

To ensure that the Europe 2020 strategy is delivered a strong and effective system of economic governance has been set up to coordinate policy actions between the EU and national levels. These targets are closely related to each other, therefore progress achieved in one may have direct positive impact on the others. For example, better educational levels help employability and progress in increasing the employment rate helps to reduce poverty. A greater capacity for research and development as well as innovation across all sectors of the economy, combined with increased resource efficiency will improve competitiveness and foster job creation. Investing in cleaner, low carbon technologies will help our environment, contribute to fighting climate change and create new business and employment opportunities. The targets represent an overall view of where the

Commission would like to see the EU on key parameters by 2020. They do not represent a 'one size fits all' approach. Each member state is different and the EU of 27 is more diverse than it was a decade ago. Despite disparities in levels of development and standards of living the Commission considers that the proposed targets are relevant to all member states, old and newer alike. Investing in research and development as well as innovation, in education and in resource efficient technologies will benefit traditional sectors, rural areas as well as high skill, service economies. It will reinforce economic, social and territorial cohesion (COM, 2010). To ensure that each member states tailors the EUROPE 2020 strategy to its particular situation, the Commission proposes that these EU targets are translated into national targets and trajectories to reflect the current situation of each member state and the level of ambition it is able to reach as part of a wider EU effort to meet these targets. Therefore, the strategy includes measures that have to be taken at EU level and the member states should define their own tasks in line with the European level objectives based on their own economic and social conditions. Thus, neither the concrete targets nor the way to achieve them are the same in all the member states (COM, 2010). Based on the abovementioned, EUROPE 2020, i.e. a strategy for jobs and smart, sustainable and inclusive growth, is based on *five EU headline targets* which are currently measured by *eight headline indicators*. As the cohesion policy focuses on the regional inequalities and set the strategies based on the endogenous development of the regions, it is important to see the diverse development levels and progress of the regions of each country, and not only focus on the EU-level targets set for 2020. In this study it is not an aim to go into the regional details but to highlight the national differences within the Visegrad Group. In order to take the regional specifications into account, the member states set and published their own national targets which in some cases do not match the EU targets. The major fields of development are closely related to the ones urged in the Lisbon strategy, i.e. research and development and employment. In addition to these, innovation, lifelong education and energy efficiency/sustainability also gained importance in this advanced strategy. Hungary had an important role in launching EUROPE 2020 and its first semester, since the EU presidency was held by Hungary between 1 January and 30 June 2011. We can consider the efforts successful and we are extremely proud of such efforts, since Gödöllő, our city, was the host for the EU presidency official meetings and events.

3. MATERIAL AND METHOD

In order to see how efficient the Visegrad Group is in meeting the targets of EUROPE 2020, relevant data for the Visegrad countries for the years 2000, 2004, 2010 and 2013 has been collected. The reason for selecting these years is that

2000 was the starting date of Lisbon strategy, 2004 was the year of accession of the Visegrad countries to the EU, 2010 was the deadline to achieve the Lisbon goals and 2013 is a year for which the latest data from EUROPE 2020 is available. The major data source for the research was the Eurostat, the official database of the European Union. In addition to the headline indicators, we considered it important to see how the GDP *per capita* (as one of the most significant economic indicators of the EU) and the GDP growth varied in the examined period. In table 1 it can be seen that the GDP *per capita*, which is the indicator used for eligibility in the case of Structural Funds, has gradually increased in all four countries.

Table 1. GDP *per capita* in PPS in the Visegrad countries, 2004–2013

Country	GDP <i>per capita</i> , % (PPS)		
	2004	2010	2013
Czech Republic	75,1	81	80
Hungary	63,4	66	67
Slovakia	57	74	76
Poland	50,6	63	68
EU 27	100	100	100

Source: Eurostat (2014).

However, in the case of the Czech Republic, the increase was only 5%, which might be due to the decrease in the average of the EU as a basis for calculations (meaning mathematical increase only). Due to the accession of Romania and Bulgaria, the EU average GDP *per capita* decreased, therefore the real GDP *per capita* growth can only be mentioned for Slovakia and Poland with increase of 15–20% in the examined period. The GDP growth, however, was decreasingly moderate, especially from the year 2012 to 2013. The rate of growth is extremely low compared to former years; in the case of the Czech Republic, it even reached a negative value. In order to reflect the progress of each member state, indices have been created for each indicator, using the formula below:

$$\frac{X_i - X_{\min}}{EU\ target - X_{\min}},$$

in which X_i was the actual data of the member state in a given year, X_{\min} was the minimum value achieved by any member of the Visegrad Group. The target was always equal to the target defined by the EU to be achieved by 2020. In the case of

indicators where it was desirable to reach the lowest figures, we deducted this from 1 to reflect the real performance of the member states. Although in 2000, 2004 and 2010 the Lisbon targets were in effect regarding the employment, we compared all the data to the EUROPE 2020 targets because Lisbon ones can be considered as preparation for EUROPE 2020 and in the long term EUROPE 2020 targets need to be met. Regarding the values of indices in the case of employment, R&D, the share of renewables and the tertiary education attendants (where the member states need to achieve higher values than the current ones), the range was between 0 and 1, except for those countries which already exceeded the target. Such countries had over 1. In the case of those figures where the member states need to reduce the values, the range was between below and above zero. The further they are from meeting the target, the lower the negative value was. It is a fact that indicators and national data reflect only some of the issues and deeper investigations are necessary, but nevertheless it is useful to see how efficient the Visegrad countries are in achieving the EUROPE 2020 targets.

4. RESULTS AND DISCUSSION

This part of the study identifies tendencies in economic and social development of the Visegrad countries over the last decade. The figures show not only the real values but also the average of indices in each examined year (it is the average of the indices of the four countries), which allows to see what the cohesion looks like in the different years in relation to the EUROPE 2020 indicators.

4.1. Headline Target No. 1: 75% of the Population Aged 20–64 Should Be Employed

As it can be seen in figure 1, none of the countries have reached the EU target (75%) – which is supposed to have the value 1.0 refers to the country with the lowest figure in the Visegrad Group. However, it is clear that only the Czech Republic is close to meeting the EU target with over 70% employment rate for the whole period examined. The rest of the countries are relatively far from it, having around 57–63% employment rate. However, it needs to be mentioned that 2 countries have lower national targets for employment than the EU target: Slovakia and Poland – 72% and 71%, respectively. If we look at the indices of the 4 examined years, it can be seen that Poland was in the last place in 2000 and 2004 but later Hungary took its place and has become the last in the ranking, which means obvious recession for Hungary. Regarding Poland, there is a surprising tendency observed: employment rate in Poland was the lowest in 2004 (57.3%) and by 2010 it managed to achieve the highest increase reaching 64.3% and to maintain it later on. The abovementioned Polish increase is reflected in figure 2.

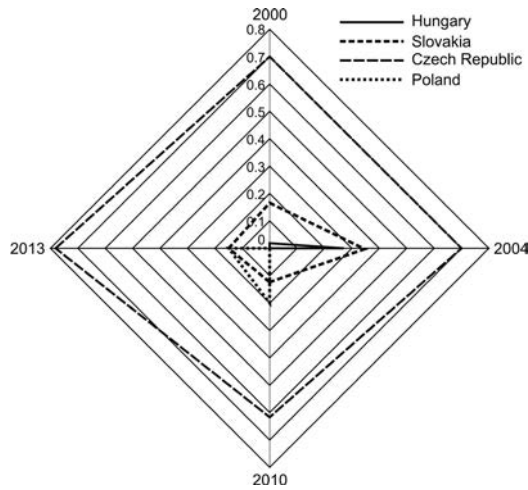


Fig. 1. Index for employment rate in the Visegrad countries (according to countries)
Source: authors' elaboration based on Eurostat (2014)

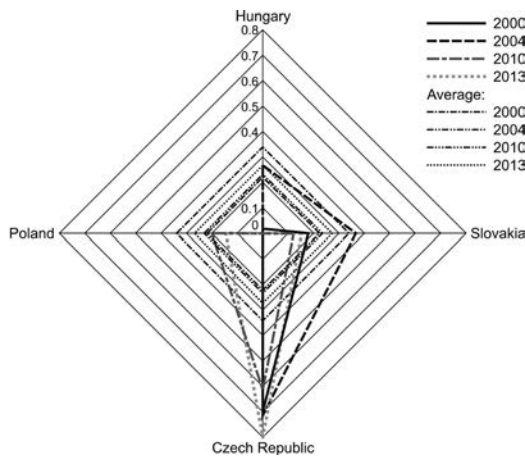


Fig. 2. Index for employment rate in the Visegrad countries (according to years)
Source: authors' elaboration based on Eurostat (2014)

The average of the group was the highest in 2004, however, the trend of average figures shows the distance between the real performance and the expected one. After a gradual increase until 2004, a sharp decrease can be observed by 2010 in all the countries except for Poland. Poland is the only country which had shown increase by that year. If we consider the average, we can see that the strong situation of the Czech Republic pulled up the figure, while the rest of the countries had figures around or under the average, with the exception of Slovakia for the

year 2004. In general, the countries were in a relatively good economic situation in the year of their EU accession. Later on they lost some of their strengths, partly due to the global financial crisis in 2008–2009.

4.2. Headline Target No. 2: 3% of the EU’s GDP Should Be Invested in R&D

As for R&D expenditure as GDP percentage, it has to be stated that none of the countries reached the index value 1, meaning that none of them reached the EU target (3%), while one country – the Czech Republic – managed to reach its national target (1%), which is significantly lower than the EU target. National targets of the countries reflect their handicap compared to Western Europe: Hungary set 1,8%, Slovakia 1%, the Czech Republic 1% (public sector only) and Poland 1.7% as national targets to be reached. While in 2000 Poland had the lowest value (0.64%), later on Slovakia took the last place, having the poorest figure for R&D expenditures in each examined year. In figure 3 it can be seen that the countries achieved gradual increase, however, they are still far from reaching the expected EU target.

Looking at figure 4, it is clear that there was a gradual increase in the average index of the four countries, meaning that the average performance of the region was improving. The Czech Republic was the best performer and Hungary was continuously catching up over the years.

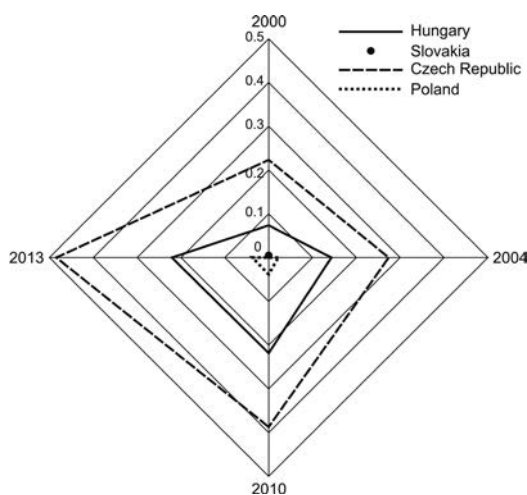


Fig. 3. Index for R&D expenditures in GDP percentage of the Visegrad countries (according to countries)

Source: authors' elaboration based on Eurostat (2014)

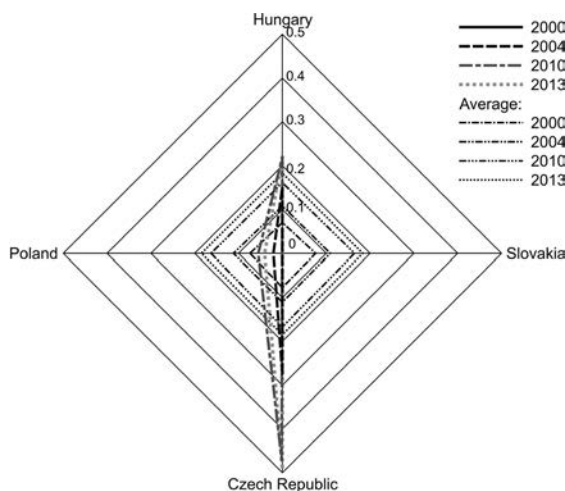


Fig. 4. Index for R&D expenditures in GDP percentage of the Visegrad countries (according to years)

Source: authors' elaboration based on Eurostat (2014)

4.3. Headline Target No. 3/a: Reduction of the Greenhouse Gas Emissions by 20% Compared to 1990

It can be observed in figure 5 that it is the first indicator in which at least one country met the EU target. Slovakia, Czech Republic and Hungary had very favourable positions in the examined period, since they had already met the 20% reduction target in 2000 and managed to keep their good position. The Czech Republic kept its figures at an approximately similar level, while Hungary managed to turn from negative to positive, meaning that it was able to reach the EU target after a recession in 2004. Poland had the poorest performance over the years, it did not achieve 20% reduction in greenhouse gas emissions compared to the year 1990 (showing negative values in figure 5).

As Figure 6 shows, the average of the four countries increased continuously, which means that overall the countries were approaching the EU target, with Slovakia and Hungary being the strongest. If we consider the national targets, we need to mention that none of the countries set 20% reduction as national targets. They defined more moderate reductions as official targets than the EU as a whole. Hungary was supposed to reach 10% reduction according to the national target, Slovakia 13%, the Czech Republic 9% and Poland 14%. As for meeting such targets, we have to state that all the countries have reached their national target indicators.

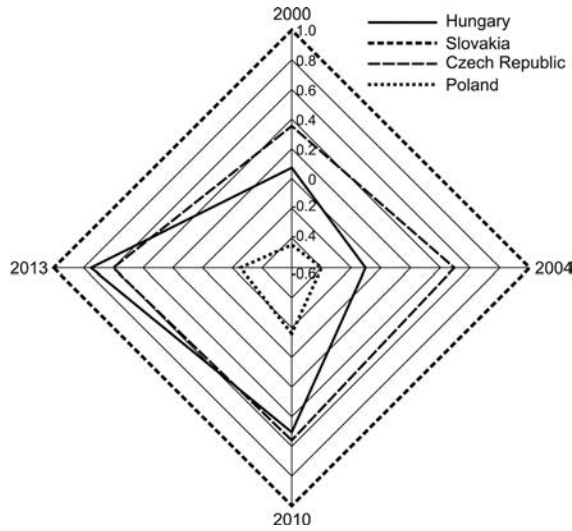


Fig. 5. Index for greenhouse gas emissions of the Visegrad countries (according to countries)
Source: authors' elaboration based on Eurostat (2014)

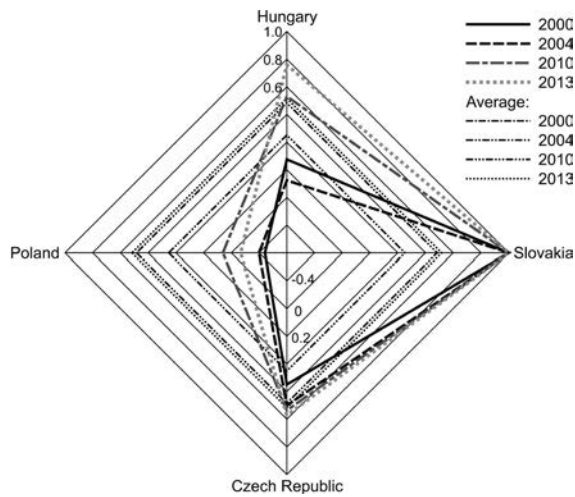


Fig. 6. Index for greenhouse gas emissions of the Visegrad countries (according to years)
Source: authors' elaboration based on Eurostat (2014)

4.4. Headline Target No. 3/b: Increase in the Share of Renewable Energy Sources in Final Energy Consumption to 20

Regarding this indicator, it needs to be mentioned that there is no data available for the year 2000, so only 2004, 2010 and 2013 have been included in the research. Figure 7 shows only 3 countries, because Hungary had the minimum values in all the years examined. Similarly to the other indicators, the country with the minimum value was designated as 0. Therefore, Hungary is not seen in the figure.



Fig. 7. Index for share of renewables in gross energy consumption in the Visegrad countries (according to countries)
Source: authors' elaboration based on Eurostat (2014)

It is true for all the countries in question that they did not meet the EU target, which would mean a 20% share of renewables in gross energy consumption. It needs to be stated that Poland had the most favourable position in 2004, and it was the second best in the rank later on as well. In real values, all the countries managed to increase the share of renewables, however, the index does not show that continuous trend due to the changes in the minimum performance in the group applied in the formula. Despite the lower commitments made by the countries in their national targets (Hungary – 14.65%, Slovakia – 14%, Czech Republic – 13% and Poland – 15.48%), the general picture is not really bright. None of the countries managed to reach even their own national targets in the examined years. The Czech Republic managed to reach the maximum share, namely 11.2% in 2013. In figure 8 the tendency of the average index is fluctuating. There was a drop in 2010, but the value of 2004 was reached again by 2013.

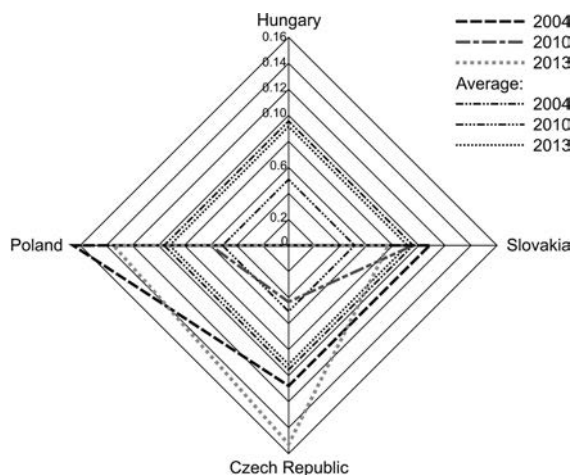


Fig. 8. Index for share of renewables in gross energy consumption in the Visegrad countries (according to years)
 Source: authors' elaboration based on Eurostat (2014)

4.5. Headline Target No. 4: The Share of Early School Leavers Should Be under 10% and at Least 40% of 30–34 Years Old Should Have Completed a Tertiary or Equivalent Education

In the case of the early school leavers' indicator, the best-performing countries had data over 0 if they reached the required EU target. According to the figures, only Hungary has to make further efforts to meet the EU target, with value below zero. Figure 9 shows its handicapped situation compared to the other Visegrad countries. Figure 10 reflects the different positions of the countries in this regard. There is a strong similarity among three countries, while Hungary is lagging behind despite the gradual improvement (see figure 10).

It is a positive tendency that the average values increased gradually over the years (with a slight drop by 2013). Similarly to other headline indicators, the countries set various targets at national levels. It is only Hungary which has the same target as the EU (10%). All the other countries set lower targets, meaning that they wish to reduce the share of early school leavers to 6% (Slovakia), 5.5% (Czech Republic) and 4.5% (Poland). As for the tertiary school attainment, it needs to be stated that the Czech Republic was in the last place in 3 years out of four in the research. It had the lowest figures in this regard, having zero in 3 years on the figure. What should be highlighted is that Poland reached the target (indicated as 1 in figure 11) in 2013, meaning that the tertiary school attainment reached 40% among the 30–34 year-old population due to gradual increase.

It should be added that except for the year 2000, Poland occupied the first place in the ranking over the period. In addition, Hungary also increased its figures over the

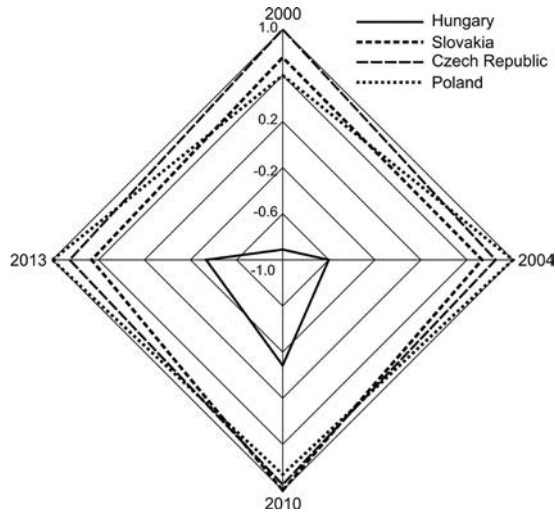


Fig. 9. Index for share of early school leavers in the Visegrad countries
(according to countries)

Source: authors' elaboration based on Eurostat (2014)

years but it is still below the EU target. National targets also show various picture, with the Hungarian 30.3%, Slovakian 40%, Czech 32% and Polish 45%. If we compare the performance of the countries to their national targets, we can see that Hungary managed to reach the national target by 2013 (having the lowest target compared to

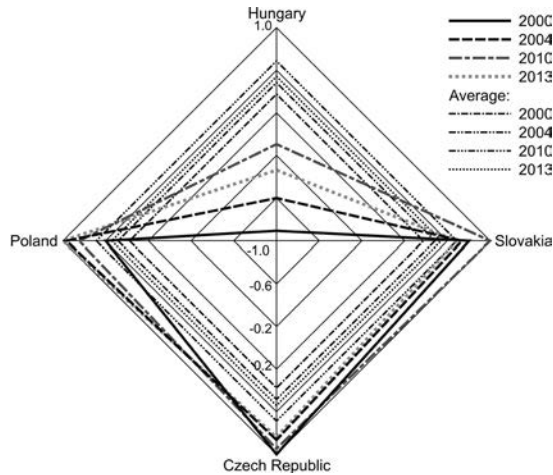


Fig. 10. Index for share of early school leavers
in the Visegrad countries (according to years)

Source: authors' elaboration based on Eurostat (2014)



Fig. 11. Index for tertiary school attainment in the Visegrad countries (according to countries)

Source: authors' elaboration based on Eurostat (2014)

the others!) and even Poland was quite close to its target (45%), which is a much more spectacular success, since its national target is higher than that of the other countries. So Poland's No. 1 place is unquestionable. Improving situation in tertiary education is reflected by the gradual increase in the average value, as can be seen in figure 12.

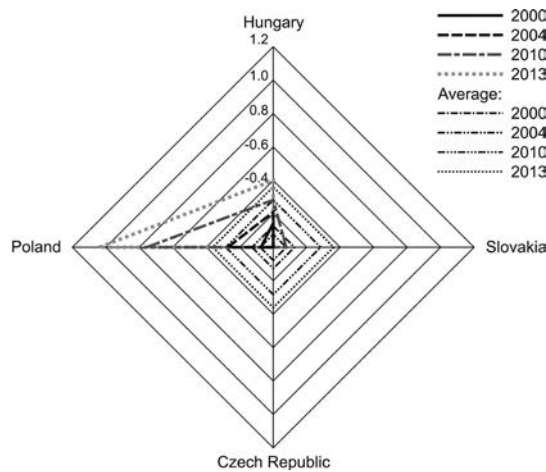


Fig. 12. Index for tertiary school attainment in the Visegrad countries (according to years)

Source: authors' elaboration based on Eurostat (2014)

The question is whether the countries have planned to take measures on the labour market to provide appropriate jobs for the large number of people with college/university diplomas.

4.6. Headline Target No. 5.: Reduction of Poverty By Aiming to Lift at Least 20 Million People out of the Risk of Poverty or Exclusion

Due to lack of data for the year 2000, only the years of 2004, 2010 and 2013 were taken into consideration. We need to mention that the variation between the indices of the countries was the largest in the case of poverty indicator, referring to the great social discrepancies within the Visegrad Group. When interpreting the data in figure 13, we need to see that the lower is the figure below zero, the further is the country from meeting the target. What could be surprising is that Poland achieved a significant improvement from 2004 to 2010 and it managed to further improve slightly that position by 2013 (see figure 14).

Figure 14 clearly shows the strong position of the Czech Republic, which had the maximum values already in 2004. Hungary had stagnating or slightly increasing values, which is the opposite of the expected results. As the averages gradually increased, we can state that social conditions gradually improved in the countries. However, the national targets show a diverse picture again. For example, Hungary intends to reduce the number of people at risk by 450,000, while Slovakia by 40,000 and the Czech Republic by 30,000. The target of Poland, namely 1,500,000, is also a shocking data.



Fig. 13. Index for people at risk of poverty or social exclusion in the Visegrad countries (according to countries)

Source: authors' elaboration based on Eurostat (2014)

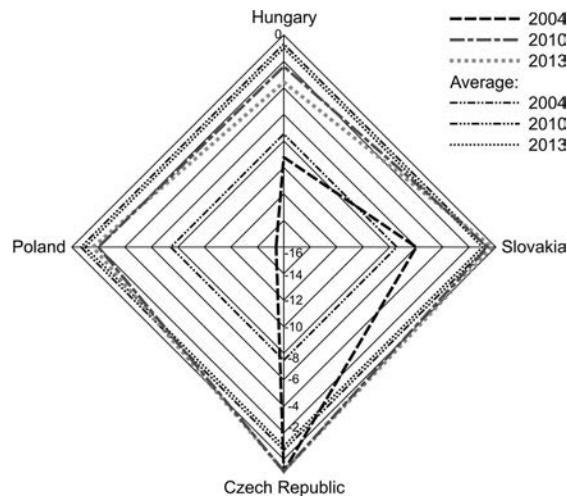


Fig. 14. Index for people at risk of poverty or social exclusion in the Visegrad countries (according to years)
Source: authors' elaboration based on Eurostat (2014)

5. CONCLUSIONS

In summary, the countries of the Visegrad Group have their own targets set at national level and additional challenges resulting from regional discrepancies. The aim of this study is to see how much progress the Visegrad countries have made since the beginning of the 21st century in relation to EU level strategies and development targets. The research results reflect the different starting points/situations of the countries, which made it more difficult to achieve cohesion. The economic situation of the Visegrad countries showed considerable diversity even at the time of their EU accession, which was further amplified by the use of European Union's Structural and Cohesion funds. The differences between the countries were partly due to the various intensity rates of funds, the various levels of own funds, and different priorities assigned to the development objectives in their national operational programmes.

Based on the indicators detailed above, we can see that territorial cohesion within the Visegrad Group has not been achieved in all the aspects, which makes it more difficult for the countries to represent a strong cooperation within the EU28. There are fields where the countries performed well, e. g. greenhouse gas emissions, share of renewables, human resource development, and reducing the risk of poverty (except for Hungary), while there are sectors where they are still lagging behind (R&D expenditures, employment) not only in the light of EU targets, but also their

own national targets. Regarding some of the indicators, we can observe the specific situation of Hungary. There is strong correlation between the use of renewable energy and the share of population at risk of poverty. Of the four countries, Hungary's energy-dependence is the greatest. Restructuring can be carried out by paying more attention renewable energy sources. In our opinion, large investments in geothermal energy may bring a potential solution to this problem, because they can play a major role in job creation, thus in decreasing the proportion of people living in poverty. Geothermal energy can be found almost everywhere in Hungary, so it may contribute to sustainable development in several ways. Poland is lagging behind as regards the meeting of the greenhouse gas reduction target. The reason for it can be the economic structure of the country and the composition of the related energy portfolio. Alternative energy sources may bring the expected positive results to Poland as well, both in respect of reduction of greenhouse gases emission and poverty. As for the Czech Republic, the outstanding figures are primarily due to the structure of industry within the national economy. The rate of processed products, the car manufacturing industry, the gradual transfer of innovations into the economy are all explanatory factors for its favourable position among the countries, while in Slovakia, the positive effects of the introduction of the euro contributed significantly to the improving of the tendencies.

Overall, it can be stated that cohesion among the Visegrad countries has been growing, but the country-specific challenges (e.g. poverty – Poland, Hungary; high percentage of early school leaving – Hungary; low employment rate – Hungary; poor R&D sector – Slovakia) need to get more emphasis in the future. Considering the abovementioned (with special focus on the country-specific challenges), we believe that economic cooperation needs to be strengthened, national development priorities and directions should be harmonized and cross-border cooperation must be encouraged and developed. The results of joint R&D projects should be integrated and transferred to the economies and joint R&D directions need to be elaborated for the future.

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Gyorgy JONA*

DETERMINANTS OF HUNGARIAN SUB-REGIONS' TERRITORIAL CAPITAL

1. THEORETICAL BACKGROUND AND THE APPLIED MODEL

The concept of territorial capital belongs to the endogenous or/and new regional growth theory that collects, categorises and quantifies with spatial econometric methods those tangible and intangible, endogenous and exogenous assets that characterise regional economic development and growth. The introduction of the concept of territorial capital was necessary because it has been proved that intangible goods play a major role (in the long term), besides tangible assets, in regional development and growth (Rota, 2010; Camagni, 2011; Camagni *et al.*, 2011; Stimson *et al.*, 2011; Veneri, 2011; Camagni-Capello, 2013; Capello, 2013).

Close connection exists between territorial capital and regional economic development. In the measurement of territorial capital such territorial capacities were considered that are not, or are only partially, exploited by the region. Ranking the regions on the basis of their territorial capital (ex-ante approach) and regional GDP (ex-post approach) shows the difference between these two approaches. It occurs because territorial capital shows not only the achieved development but also the level that is potentially available (Jóna, 2013). The value of the realized resources of a region is not equal with the regional performance; the two values can be equal only if the region exploits all its territorial capacities. This is expressed by the following formula:

$$TC_{r,t} = UA_{r,t} + RSD_{r,t}, \quad (1)$$

where TC is the territorial capital, UA is the value of the unexploited assets, RSD is the realized stage of development, r is the region and t is the time. It is logical

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that if $UA = 0$, the region maximally exploits and mobilizes its territorial capital. The value of UA (after normalization of data) is between 0 and 1, so the higher its value, the higher the unexploited regional capacity is and *vice versa*.

The goal of this study is to present the territorial capital of Hungarian sub-regions (LAU1 level) and to measure its annual change between 2004 and 2010. It tries to find out by which factors and how much the changes of territorial capital are determined at macro-regional level and in sub-regions at different development levels. Basically, the concept of territorial capital is not discussed here (for details see Capello *et al.*, 2009; Camagni *et al.*, 2011; Caragliu and Nijkamp, 2011; Perucca, 2013) but is applied following the earlier research practice (Camagni and Capello, 2013).

In this sense, the indicators of nine territorial potentials are collected and classified in seven kinds of capitals (economic capital, social capital, relational capital, infrastructural capital, institutional capital, human capital, cultural capital). Fundamentally, territorial capital embraces these seven capitals. Territorial capital exists as dependent variable and the above mentioned seven capitals are explanatory variables in the applied model.

1.1. The Model of Territorial Capital

As already indicated, this model includes seven explanatory variables. Economic capital shows the economic performance of the region, Camagni calls these rivalry and tangible goods. A lot of scholars used similar indices in the case of measurement of economic capital (Capello *et al.*, 2009; Brasili, 2010; Veneri, 2011; Brasili *et al.*, 2012). Furthermore, infrastructural capital contains the aptness and size of the elements of infrastructure – the same indicators were used in studies by Capello *et al.*, 2009; Brasili, 2010; Russo *et al.*, 2010; Brasili *et al.*, 2012; Russo and Servillo, 2012).

Institutional capital represents public institutions and their services. It is typical that cultural institutions appear here (one exception is the post office). In this model a close theoretical and empirical correlation emerges between the institutional and the cultural capital. Caragliu and Nijkamp (2008) also applied a similar indicator system. The human capital basically expresses two aspects of the local society: on the one hand, the health condition of the population, and, on the other hand, the region's knowledge level. The health status determines the regional welfare as well; if the population is healthy, the economic output and performance may increase, the social transfers decrease etc. The health condition is operationalized with the traditionally accepted indicators (e.g. infant mortality), and the knowledge level is measured by the number of students and teachers participating in the tertiary education and the number of people enrolled in the libraries (Kunzmann, 2007; Caragliu-Nijkamp, 2008; Camagni *et al.*, 2011; Brasili *et al.*, 2012; Russo and Servillo, 2012).

Social capital shows the level of social integration. It has two dimensions: (1) employment and (2) local social inequalities. The first one is measured – among others – by the employment rate of the sub-regions and the second one embraces i.a. the Hoover-index. Together they demonstrate well the level of social integration. In addition, homelessness causes social disintegration (it does not mean that homeless people are harmful for the society, but the phenomena itself can lead to disintegration of local society). It is typical that the homeless provider institution system functions in cities and metropolises (of course there are some exceptions), but public kitchens (kitchens for the poor) are concerned with groups living in social exclusion in small villages or towns. In general, local trust relations can be measured by observation of popular action and economic crimes (Russo *et al.*, 2010; Veneri, 2011; Brasili *et al.*, 2012).

Relational capital firstly includes the communicational devices. The relational nets can come into being formally and informally. The first one usually occurs in civilian organizations, the latter evolves in formal and informal clubs (club-goods). In Hungary they are relatively new. In the third sector the relational capital can be piled up, which can be converted to economic processes, thus becoming the driving force of regional growth. Clubs for the old belong to this category (here special club-goods are formed) because in the aging societies local welfare is determined by the quality of interaction of old people (Camagni *et al.*, 2011). Ultimately, cultural capital includes a number of different cultural institutions and their capacity (Caragliu-Nijkamp, 2008; Brasili *et al.*, 2012). The details are shown in the table 1.

Table 1. Variables and sub-indices constructing the territorial capital

Aggregated index	Sub-index/ dimension	Variables
Territorial capital	Economic capital	1. Stock of private capital 2. Yearly private investments 3. Regional GDP 4. Output per 1 firm
	Infrastructural capital	1. Footpath and pavement per 1 km ² 2. Cycle path per 1 km ² 3. Length of national road per 1 km ² 4. Length of gas pipe per 1 km ² 5. Drinking water system for public utility per 1 km ² 6. Length of sewer per 1 km ² 7. Size of reservation per 1 km ² 8. Size of total green area

Table 1. (cont.)

Territorial capital	Institutional capital	<ol style="list-style-type: none"> 1. Number of libraries per 1,000 people 2. Number of institutions for public culture per 1,000 people 3. Number of museums per 1,000 people 4. Number of theatres per 1,000 people 5. Number of cinema seats per 1,000 people 6. Number of post offices per 1,000 people 7. Number of art communities per 1,000 people
	Human capital	<ol style="list-style-type: none"> 1. Number of infant mortality per 1,000 live-births 2. Number of General Practitioners per 1,000 people 3. Number of chemist's per 1,000 people 4. Number of people enrolled in libraries per 1,000 people 5. Number of students taking part in tertiary education per 1,000 people 6. Number of teachers working in tertiary education per 1,000 people
	Social capital	<ol style="list-style-type: none"> 1. Number of the registered unemployed per 1,000 people in active age 2. Daily average number of people in the communal kitchen 3. Number of people paying taxes per 1,000 people 4. Number of crimes with prosecution per 1,000 people 5. Number of economic crimes per 1 company 6. Domestic migration difference 7. Hoover-index
	Relational capital	<ol style="list-style-type: none"> 1. Number of Internet users per 1,000 people 2. Number of mobile phone subscriptions per 1,000 people 3. Number of non-profit organizations per 1,000 people 4. Number of clubs for old people and the number of members in them per 1,000 old people
	Cultural capital	<ol style="list-style-type: none"> 1. Number of members of art communities per 1,000 people 2. Number of theatre-goers per 1,000 people 3. Numbers of participants in cultural events per 1,000 people 4. Number of museum visitors per 1,000 people 5. Number of people going to permanent theatres per 1,000 people 6. Number of cinema visits per 1,000 residents 7. Number of monuments per 1,000 people

Source: author's calculation.

2. METHOD

In this study territorial capital is analyzed between 2004 and 2010 at sub-regional level (LAU-1 or NUTS-4 level). Hungary had 174 sub-regions in this period. The figures are obtained from the National Territorial Development and Land Information System. After that R-type a priori principal component analysis was

applied (further principal component analysis) to reduce the multicollinearity between the variables and to minimize the number of variables to the extent that can be accepted statistically (Caragliu and Nijkamp, 2008; Casi and Resmini, 2012; Capello and Fratesi, 2013).

Finally, only those variables were left in the model whose KMO and MSA values were over 0.5 every year. In addition, the total variance summarized for 7 years for the 7 factors was 83.37%, which exceeded the minimum expected 60% variance rate. The value of primary autocorrelation stayed in the acceptable domain in all 7 years, which is important in the case of longitudinal research, operationalising it with the Durbin-Watson test (its lowest value was 1.673 and the highest value was 2.366). Simply put, it means that our data move together, which can be seen their 'synod'. For further details see table 2.

Table 2. Main data of principal component analysis

Year	Number of principal components	Measure of Sampling Adequacy (MSA-test)	Kaiser-Meyer-Olkin (KMO-test)	Durbin-Watson-test	Redundancy*
2004	7	0.68	0.711	1.985	0.514
2005	7	0.71	0.763	2.249	0.532
2006	7	0.67	0.757	2.198	0.494
2007	7	0.78	0.801	1.995	0.501
2008	7	0.79	0.812	2.366	0.551
2009	7	0.77	0.809	2.341	0.519
2010	7	0.81	0.825	1.913	0.533

$$N = 174; \text{ sig.: } p < 0.05; * \text{ Red} = \frac{\sum_{i=1}^m \sum_{\substack{j=1 \\ j \neq i}}^m r_{i,j}^2}{m(m-1)}.$$

Source: author's calculation.

Eventually the database consists of 47 indicators, organized into seven sub-indices (types of capital). The average of these seven types of capital eventuates the territorial capital. The matrix consisting of 52,374 [43 (indicators) X 174 (sub-regions) X 7 (years)] cells came into existence.

After normalization the set of indicators was weighted because the different sub-indices determine the territorial capital with different weight (Arbia, 2006). Subsequently the figures were corrected with the method of penalty for bottleneck.

This is a relatively new method, it has not been applied in territorial capital analysis yet. With this it is achievable that a high value of one of the sub-indices will not compensate totally the value of a lower value sub-index. (Ács *et al.*, 2011; Szerb and Ács, 2011). Using the penalty for bottleneck method the normalized value of territorial capital can be corrected and specified.

The practical use of the method is simple. First of all the normalized variables are needed to rank in order of size (Rappai and Szerb, 2011):

$$0 \quad X_1 \quad X_2 \quad \dots \quad X_k \quad 1. \quad (2)$$

After this from a certain variable we deduct the value of the smallest variable belonging to it, then 1 is added to a given value, and by applying the logarithmic function we receive a value which is ready to be corrected, in other words:

$$\sum_{i=1}^k x_i' = kx_1 + \sum_{i=1}^k \ln(1 + x_i - x_1), \quad (3)$$

where x_1 stands for the correcting factor, x stands for the sub-index that needs to be corrected, and 'min' stands for the variable with the lowest value. Finally, the value of the corrected sub-index can be obtained if we deduct the value of the correcting factor from each normalized value, so: $x_i^x = x_i - kx_1$. The following example will help to understand it better: if the value of a normalized variable is 0.6, the smallest value of the variables is 0.4, the difference between the two is 0.2. According to the above formula, the natural logarithm of $1 + 0.2$ is 0.18. This way the corrected value applying the methods will be 0.58 ($0.4 + 0.18$) instead of 0.6.

The penalty function is right if the corrected value is equal or less than the one without correction (it is logical as $0 \leq x_1 \leq x_i \leq 1$ so $x_i^x = x_i - x_1 \leq 1$). In the model this condition was realized, in other words (Rappai and Szerb, 2011):

$$kx_1 + \sum_{i=1}^k f(x_i - x_1) \leq \sum_{i=1}^k x_i,$$

$$x_1 + \frac{1}{k} \sum_{i=1}^k f(x_i - x_1) < \frac{1}{k} \sum_{i=1}^k x_i. \quad (4)$$

The steps in the measurement of territorial capital:

1. After the a priori principal component analysis the normalized figures are corrected with the method of penalty for bottleneck.

2. Applying arithmetic average¹ the territorial capital of a sub- region can be calculated using the formula:

$$tc_{r,t} = \frac{HC_{r,t} + InfC_{r,t} + InsC_{r,t} + SC_{r,t} + CC_{r,t} + EC_{r,t} + RC_{r,t}}{N_{kc}},$$

where tc is the territorial capital of the sub-region, HC is the human capital, $InfC$ is the infrastructural capital, $InsC$ is the institutional capital, SC is the social capital, CC is the cultural capital, EC is the economic capital, RC is the relational capital, N_{kc} is the number of the kind of capital, r is the region and t is time.

3. Finally, the arithmetic average of the territorial capital of the 174 sub-regions is aggregated, and national territorial capital can be calculated, in other words:

$$TC_{n,t} = \sum_{i=1}^N \overline{tc_{r,t}},$$

where TC means the national territorial capital and n is the nation.

4. It is calculated for all 7 years.

Eventually, the territorial capital is defined by 43 normalized, weighted and corrected synthetic indicators at national and sub-regional level.

3. RESULTS

3.1. The Trend of Territorial Capital

Between 2004 and 2010 the average growth of national territorial capital was 9.66% (using geometric mean), which means that average growth per year was 1.38%. Territorial capital was increasing harmoniously between 2004 and 2008, the annual growth was 0.53%. It means a relatively steady growing path (Kornai, 1972). In the first two years of the economic crisis (2009–2010) the annual growth of territorial capital at national level was 0.89%, which meant a 0.36 percentage point growth compared to the previous period.² The territorial capital growth of the Hungarian sub-regions did not stop during the first two years of the economic, it even increased in considerably. It becomes clear from

¹ It could be calculated: $G = \sqrt[n]{a_1 \cdot a_2 \cdot a_3 \cdot \dots \cdot a_n}$.

² The economic crisis arrived in Hungary later but it was more intensive. The crisis was actually perceivable from January 2009 (see László, 2013).

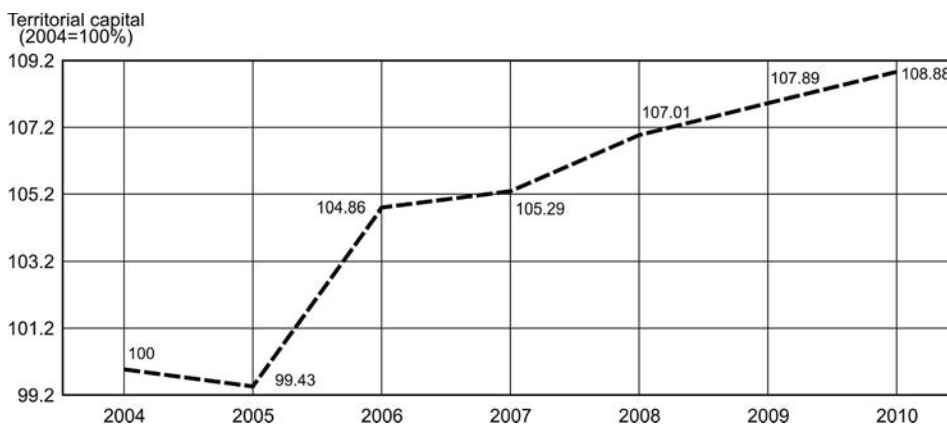


Fig. 1. The change of the territorial capital at a national level between 2004 and 2010

Source: author's calculation

figure 1 that the highest territorial capital accumulation was from 2005 to 2006, then the growth tendency began to slow down. It is clearly visible that the effect of the economic crisis could as well be realized statistically in 2009, which was followed by a correction.

3.2. Convergence versus Divergence

Henceforward, at this moment the important question is whether the sub-regions with lower territorial capital could accumulate their territorial capital in a faster way than the sub-regions with higher territorial capital; whether the convergence of territorial capital can be traceable in this period.

The measurement of territorial convergence actually depends on how many sub-regions are compared. The annual growth average of 20 sub-regions with the highest territorial capital during 7 years measured with a geometric mean was 4.83%, while 20 sub-regions with the lowest territorial capital decreased by 4.75%. Comparing the annual average growth of the two periods (5 years before the crisis and two years during the crisis), similar results could be obtained. Before the crisis the annual average of the growth of the 20 sub-regions with the highest territorial capital was 5.73%. During the two years of the crisis it decreased to 5.16%. The extent of the decrease was insignificant. In the 20 sub-regions with the lowest territorial capital in 5 years before the crisis the average decrease was 4.51%, from 2009 to 2010 it became 4.26%. Simply put, there was no convergence between the 20 sub-regions with the lowest and the highest territorial capital in Hungary between 2004 and 2010 (see figure 2).

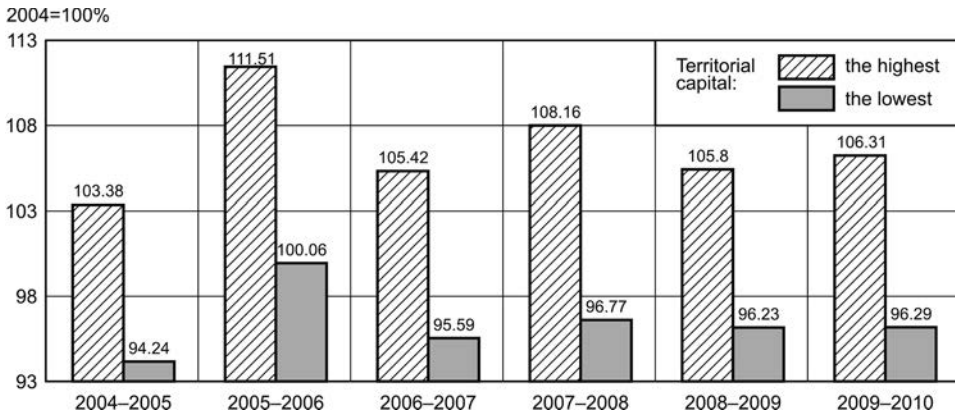


Fig. 2. The rate of growth of the 20 sub-regions with the lowest and the highest territorial capital between 2004 and 2010
Source: author's calculation

However, comparing the rate of territorial accumulation of the 40 sub-regions with the lowest and the highest territorial capital, a totally different result can be obtained. 40 sub-regions with the lowest territorial capital increased annually by 0.24% on average, while 40 sub-regions with the highest territorial capital decreased by 2.26% annually. The convergence in this context can be traceable but it could evolve if the state of the most developed sub-regions worsened relatively, and the ones being in the worst state improved minimally (see figure 3). In this comparison the territorial convergence can be measured statistically because the 40 sub-regions with highest territorial capital were marginalized.

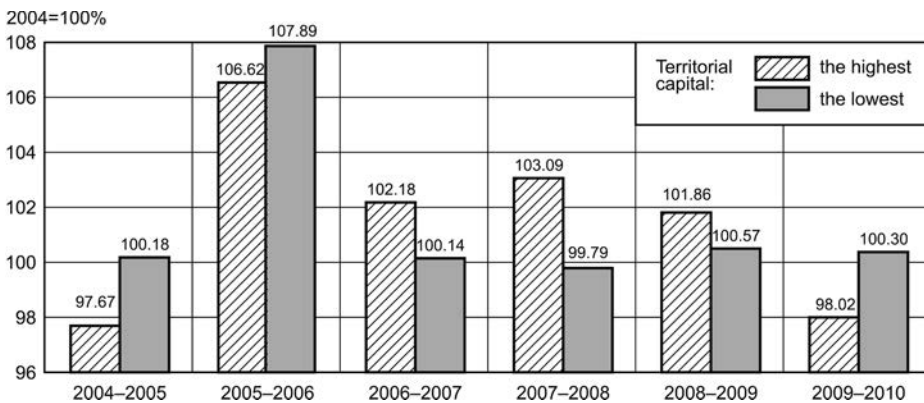


Fig. 3. The rate of growth of the 40 sub-regions with the lowest and the highest territorial capital between 2004 and 2010
Source: author's calculation

3.3. Factors Determining Territorial Capital

This section examines which capital types were determining the territorial capital and to what extent between 2004 and 2010 at national and sub-regional level. To find the answer, first of all it has to be analyzed whether there is correlation between the dependent variable (territorial capital) and the independent variables (seven capital types). According to the results, each capital type was in an average positive relation with the territorial capital, except the social capital, whose correlation was weak.³ The correlation is accepted at 5% significance level every year. The value of the correlation coefficient does not exceed 0.7, so no sub-index (capital type) had to be eliminated from the analysis. After this the multiple linear regression analysis is applied to what extent the seven capital types determined the territorial capital at the national level year after year. The explaining power of the independent variables (capital types) is measured by the standardized regression coefficient; it is also called beta value. The beta values including the partial effect of the explanatory variables show the extent of the explanatory power of dependent variables effect on the independent variables (Ajmani, 2009). The significance level of t-test and F-test was acceptable ($p < 0.05$) every year. According to table 3, the accumulation of territorial capital was determined the most by relational, economic, an institutional capital at national level between 2004–2007, while between 2008 and 2010 a collective dominance of relational and economic capital could be observed. Furthermore, in 2008 the effect of economic capital became slightly stronger than of relational capital, then in 2009 the cultural and the institutional capital changed their positions. At sub-regional level the structures of territorial capital changed significantly during the economic crisis. However, at the national level the system of territorial capital can be considered as constant: the accumulation of territorial capital was determined significantly by relational, economic and cultural capital. In other words, at national level the accumulation of territorial capital can be sustainable if the interaction between local economic units (including small and medium sized enterprises and their links) strengthens and becomes steady by exploiting their cooperative advantages (Menezes *et al.*, 2013). The strengthening of the collaborative advantages based on the relational proximity contributed to the growth of territorial capital (Capello, 2012).

The national territorial capital can be contributed by those economic actors that are in active, constant relation with each other and the members of the society; to preserve this relation they use tools and means of information technology, and their acts are embedded in the local cultural and civil institutional systems. If these three capabilities are present at the same time and can be mobilized, the harmonious regional growth and development can start (Kornai, 1972).

³ This weak relation ($r = 0,38$) was measurable only in 2 years (2009 and 2010). Before this it was in a positive relation with territorial capital.

Table 3. Annual changes in capital types determining territorial capital on the basis of beta value

Capital types	Year						
	2004	2005	2006	2007	2008	2009	2010
Relational capital	0.275	0.274	0.301	0.291	0.275	0.278	0.301
Economic capital	0.26	0.262	0.262	0.268	0.276	0.273	0.277
Institutional capital	0.255	0.24	0.242	0.207	0.206	0.207	0.215
Cultural capital	0.209	0.201	0.19	0.188	0.195	0.225	0.204
Human capital	0.189	0.184	0.177	0.182	0.189	0.182	0.181
Social capital	0.169	0.169	0.167	0.166	0.167	0.166	0.169
Infrastructural capital	0.146	0.128	0.123	0.142	0.139	0.141	0.121

Source: author's calculation.

The link between relational and economic capital means that the chance for growth of the region can be improved by coordination, cooperation and gathering of clusters of economic units embedded regionally. Note that relational capital clearly shows that intangible assets also determine the conditions of regional growth – the performance of a region increases if its relational capital is high. Increase in economic and relational capital contributes to the same extent to the success of local entrepreneurs, which is proved by the structure of territorial capital in Hungary.

3.4. The Structure of Territorial Capital in Sub-Regions

This section analyses the structure of territorial capital in respect of the sub-regions. It is measured in the following way:

1. Comparison of the data between 2004 and 2010 shows which sub-region could reach the highest territorial capital concentration, and which had the largest loss.
2. On this basis a ranking has been made; at the beginning are the sub-regions with the highest territorial capital, and the sub-regions with the lowest territorial capital are at the end of the ranking.
3. Sub-regions are divided into five groups on the basis of territorial capital.⁴

⁴ During the classification the starting point was average annual growth, which was 1.38% per year. In other words those sub-regions were the ones with average growth which reached a growth of 9.6% from 2004 to 2010 (1.38×7). Those sub-regions had significant growth which developed twice as fast as the average ($9.6 - 19.2\% = -9.6$). Those sub-regions had decrease which shrank twice as fast as the average. Medium categories were determined on this basis.

4. Finally, multiple standardized linear regression analysis is used to understand which capital type contributes to what extent to the change in territorial capital in the five categories (Perucca, 2013).

In the analyzed period, the Rétság, Balatonföldvár, Balatonalmádi, Szob, Ercsi, and Érd sub-regions had the highest territorial capital loss. It might be surprising that all of these are sub-regions with the highest GDP. The Budaörs, Baja, Vásárosnamény, Lengyeltót, Csurgó, Szentgothárd and Edelény sub-regions accumulated the most territorial capital. The listed sub-regions (except Budaörs) can be considered as underdeveloped. The summarizing results can be seen in figure 4.

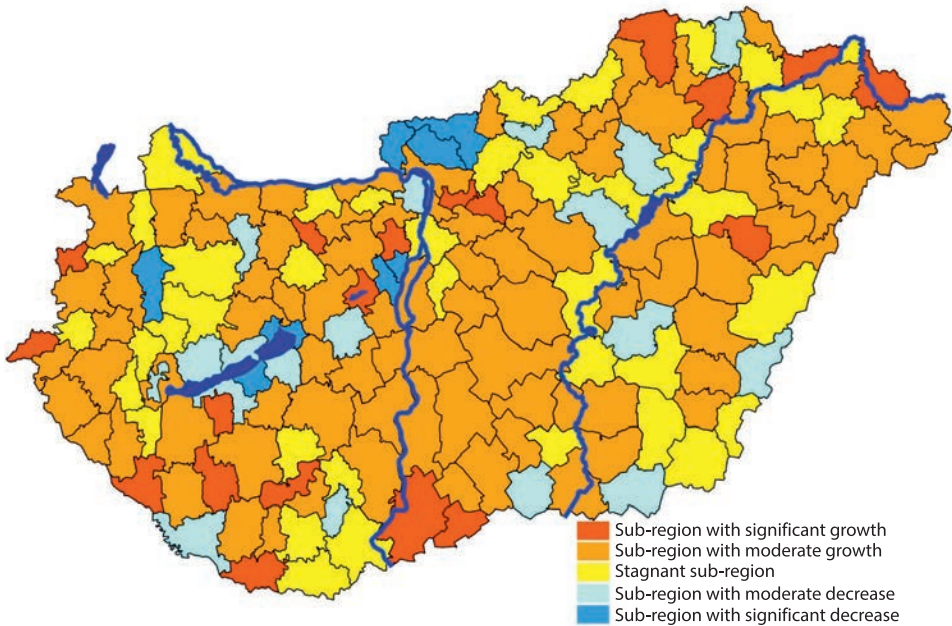


Fig. 4. Change in territorial capital between 2004 and 2010 per sub-regions

Source: author's calculation

There was *significant territorial capital growth* in 19 sub-regions (see figure 5). It is important that 14 of these have low territorial capital and only 5 of these sub-regions have high territorial capital; the sub-regions with relatively low territorial capital managed to preserve their territorial capital against the crisis. The question is how they were able to do it. It can be seen from figure 5 that the structure of the territorial capital of these sub-regions basically differs from the national average. It is typical that the most determining is the economic, cultural and relational capital; in other words, territorial capital is accumulated in those

sub-regions even during the crisis where the background conditions of cultural economy exist and prevail (Colombo *et al.*, 2011). Cultural economy means that cultural institutions and the cultural industrial sector of the region are actively utilized, socioeconomic interactions thicken and these are embedded in regional economic processes, which finally define regional development (Bain-McLean, 2013; Donald *et al.*, 2013).

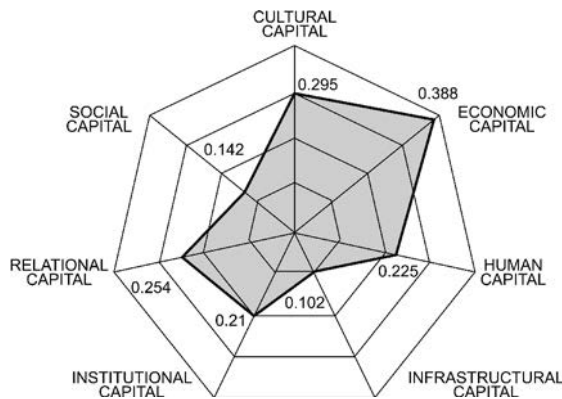


Fig. 5. The territorial capital structure of the sub-regions with significant growth (beta-value)
Source: author's calculation

The partial effect of human capital is relatively large; the partial effect of institutional capital is smaller than the national average, that is to say the territorial capital structure of the sub-regions will be so stable with the revaluation of knowledge and the network proximity becoming closer that it could grow even during the crisis (Faludi, 2014). According to the results, it is true without exception for the sub-regions showing an outstandingly high territorial capital growth that they relieved their club goods in the structures of the *cultural economy*, and adapted the channels of the institutional system of formal and informal knowledge to market demands (Servillo *et al.*, 2012). Simply put, those sub-regions could increase territorial capital which could improve and integrate their relation system, cultural pattern and knowledge base into regional economic processes (Fuchs and Klingemann, 2011). Of course, it does not mean that these sub-regions exploited these possibilities maximally but it is true that the above mentioned conditions existed in this period.

The territorial capital structure of *the sub-regions with moderate growth* (including 85 sub-regions) changed slightly compared to the national average (figure 6). The difference between these two is that human capital has a stronger

influence on territorial capital than cultural capital. This result of the sub-regions can also be explained by the fact that they mobilized more effectively the advantages of socio-cultural proximity (Camagni, 2004; Stimson, 2014). The coordinating costs could decrease because the face-to-face relations and keeping in touch, and cooperation of local economic actors – despite sometimes opposing interests – resulted in increased trust, and the synergic effect could strengthen among the entrepreneurs (Desai *et al.*, 2011; Capello, 2012).

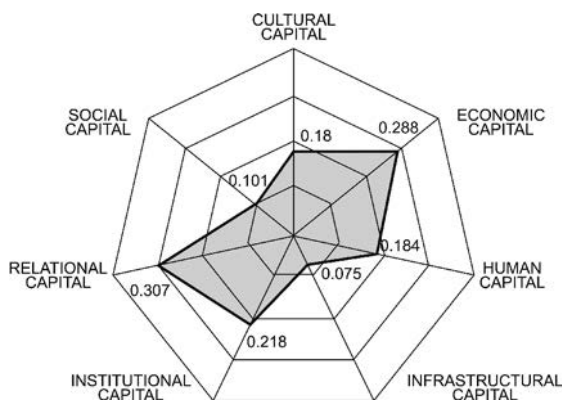


Fig. 6. The territorial capital structure of the sub-regions with moderate growth (beta-value)
Source: author's calculation

The *stagnant sub-regions* do not follow any pattern on the basis of their geographical location. 42 sub-regions are in this group. It is typical for them that the effect of social capital is much stronger than the national average, while the economic, institutional and human capital were able to change the territorial capital to a much lesser extent. It means that in these sub-regions local social inequalities are relatively smaller; the institutions supplying cultural services and the knowledge capital are present to a smaller degree (see figure 7). It is interesting that in these sub-regions the improvement of social relation systems contributed to territorial capital accumulation only very slightly. In the territorial capital structure (see figure 8) of the sub-regions with moderate decrease (there were altogether 19 such regions) the effect of the institutional capital stands out significantly against the other capital types, while the influence of the economic and relational capital is de-emphasized and the human capital also loses some of its determining power. If institutional capital gets stronger in the way that during this period the socioeconomic criteria changed slightly, it causes a slight decrease in the territorial capital of the sub-region.

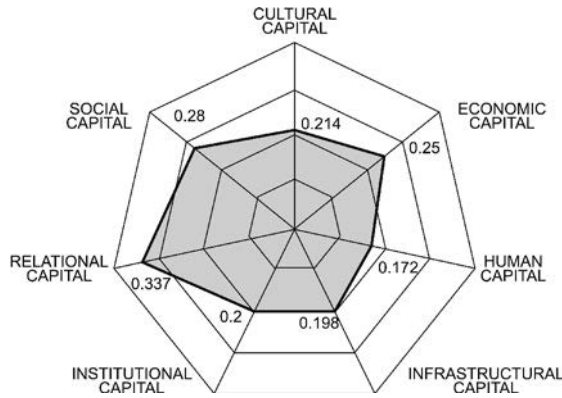


Fig. 7. The territorial capital structure of the stagnant sub-regions (beta-value)
Source: author's calculation

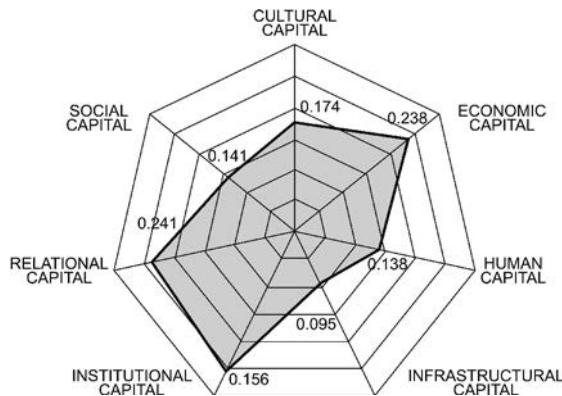


Fig. 8. The territorial capital structure of the sub-regions with a moderate decrease (beta-value)
Source: author's calculation

The sub-regions with significant decrease (including 9 regions) were typically the sub-regions in Nógrád, Somogy, northern sub-regions of Pest County, western regions of Vas County, and north-eastern and southern sub-regions of Balaton belong. It is remarkable that none of the sub-regions in Tiszántúl can be found here. Institutional capital causes significant changes in the territorial capital structure in sub-regions with significant decrease. It does not mean that institutional capital sets back growth, only that the so powerful partial effect of institutional capital and this territorial capital structure set back the territorial capital accumulation

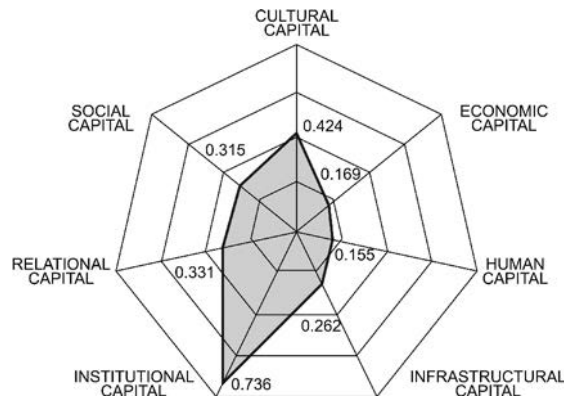


Fig. 9. The territorial capital structure of the sub-regions with a significant decrease (beta-value)
Source: author's calculation

(Rodríguez and Pose, 2013; Capello and Perucca, 2014). The effacement of the relational capital refers to the shattered business relation among local enterprises (Bathelt and Gluckler, 2011) (see figure 9). A further characteristic of this territorial capital structure is that the explaining power of economic and human capital is much worse than the national one. These factors caused that the sub-regions lost almost 10% of their territorial capital during the analyzed seven years.

4. CONCLUSIONS

The differentiation of the territorial capital structure in the sub-regions showed that socioeconomic proximity determines significantly the territorial capital accumulation. The lack of synergy among enterprises and low education level of local society causes decrease of territorial capital. Opposite to this, the advantages coming from socio-cultural proximity resulted in a more stable, slower but balanced territorial capital accumulation. Despite the crisis, those sub-regions were able to improve their territorial capital to a significant extent where the key factors of the cultural economy appeared. The condition of balanced accumulation of territorial capital is connecting the economic capital and socioeconomic proximity. The sub-regions which exploited the background of the cultural economy were able to improve their territorial capital at a higher rate than the average. Territorial capital accumulation of Hungarian sub-regions is successful if coordination becomes more frequent among the economic actors of the region and they exploit the capacities of the network structure.

The presence of territorial capital does not automatically start regional growth. It first has to be recognized and exploited, and after this regional growth and development can start.

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Kari BURNETT*

**POLICY VS. PRACTICE: THE EFFECTIVENESS
OF REFUGEE INTEGRATION POLICIES
IN THE CZECH REPUBLIC**

1. INTRODUCTION

Forced migrants are people who are persecuted and/or mistreated and feel they cannot be protected by their own state government. As environmental disasters and local, regional and global conflicts increase, the number of forced migrants has subsequently increased. This leads to questions and concerns about the resettlement process of refugees.

In many cases, the destination country attempts to facilitate the resettlement process for refugees by creating integration policies. Most European countries have varied policy related to refugee integration. Some countries, such as the United Kingdom (UK), have a long history of resettling refugees and very detailed integration policies. Others, such as the Czech Republic, are new destination countries and create policy as situations arise oftentimes without much knowledge of their refugee population. The purpose of this paper is to examine the effectiveness of refugee integration policies through a case study of the Czech Republic.

2. LEGISTRATIVE STRATEGIES AND GOVERNANCE

An abundance of literature exists on policies related to refugees because of the intimacy between forced migration studies and policy developments (Black, 2001), although much of this literature discusses policies implemented prior to

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resettlement (i.e. asylum seeking policies). In fact, there ‘is little systematic research being carried out on settlement policy and on outcomes in various communities and regions’ (Castles *et al.*, 2002, p. 162). Evaluating policy in practice is a topic deemed essential to future research on refugee integration (Castles *et al.*, 2002). Mansouri *et al.* (2006) assert that integration policies can play a very important role in facilitating the integration process. While the bulk of the literature on integration policies in Europe focuses on the outcomes of individual policies, for example housing (Robinson *et al.*, 2003; Edin *et al.*, 2004) and employment (Bloch, 2008), some studies do focus on integration policies in their entirety (Hagelund, 2005).

According to Hagelund (2005), integration policies offering too much assistance were counterproductive and amended to help refugees become more self-sufficient. Robinson *et al.* (2003) and Edin *et al.* (2004) both examined housing dispersal policies and found them to hinder integration because of their tendency to isolate refugees in less-populated areas. I address the housing issue of refugees in the Czech Republic where there is no specific dispersal policy; however, due to the location of available housing, dispersal is taking place *de facto* and refugees often refuse the proffered housing.

Resettlement and/or integration policies are often put into practice by nongovernmental organizations (NGOs). This is an example of the state’s diminishing role in regard to refugee resettlement and is seen to be ‘an “outward” shift in responsibility away from states towards social actors’ (Gill, 2010, p. 10). Furthermore international agencies (e.g. United Nations High Commissioner for Refugees, among others) have become more involved in influencing policies concerning forced migration, adding another level to the already multi-leveled governance configuration (Betts, 2009).

3. RESEARCH METHODS

Research for this case study was performed in Prague, Czech Republic during 2008–2009. The Czech Republic is a compelling site for refugee integration research; it is in an exceptional situation as it represents a duality of positions – a marginalized position within the European Union (EU), but on the frontier of EU expansion. The country has witnessed a change in patterns from a sending to receiving country of refugees in recent years, meaning that refugee integration policy is a fairly recent phenomenon.

This research is specifically focused on Prague as most refugees in the country reside there (Government of the Czech Republic, 2007). Additionally, questions were asked about services available per the integration policies, and the site remained constant to ensure all respondents had access to the same services in the same locations.

3.1. Research Participants

I used nonprobability sampling to find participants for this research. Initially I contacted NGOs that provide legal and social services to refugees. Further participants were located through snowball sampling. Semi-structured interviews were conducted with twenty refugees. Eleven of the interviews were conducted in English, and nine in Czech and translated into English by a research assistant. Eleven participants were female, nine male, and their ages ranged from 24 to 62. Participants originated from fourteen different African, Asian and European countries and had been in the Czech Republic for less than two years to over twenty. Due to the relatively small number of refugees in the Czech Republic, the names of the participants and their origin countries will be omitted to preserve confidentiality.

To examine integration policy-making, extensive interviews were conducted with a representative from the Czech Ministry of the Interior who is responsible for housing policy and with representatives from various NGOs about their role in refugee integration policy implementation.

4. REFUGEE INTEGRATION POLICIES IN THE CZECH REPUBLIC

Czech Parliament privileged two aspects of the integration process (housing assistance, Czech language training) in the 1999 Asylum Act. The wording was sparse and included no detailed plan(s) of action. Further amendments to this Act elaborated on integration policy. In 2004, employment assistance was added. Subsequent amendments named the ministries responsible for implementing the policies, and their duties were clarified.

Funding for integration policy implementation is provided by the state budget and is revisited annually. The policy also sets forth expectations for all Ministries even if they were not provided with sufficient funding to reach their expected goals. From the mid- to late-2000s, the amount of funding and details about funding allocation for refugee integration continued to increase, which reflects the government's learning process.

Refugees are informed of integration programmes after being granted refugee status. In the case of housing, refugees tell the Ministry of the Interior if they are interested in receiving housing assistance, and the Ministry notifies refugees when/if housing becomes available. For Czech language training and employment assistance, refugees are responsible for seeking out these programmes on their own. My respondents had a degree of knowledge about Czech integration policies; most were aware and availed themselves of the services while some did not know about them and/or had never been offered the services.

It is hard to know why some were unaware of the policies. The specifics are to be communicated while asylum applications are in review and/or after applicants receive the asylum decision. Refugees receive a lot of information after the asylum decision so it is possible that the specifics of integration policy are not fully comprehended. In general, my respondents were glad the policies existed, but some suggested changes could be made, mainly to the language informing refugees of integration policy:

I think this booklet was written in too official and bureaucratic language, and I would include more information. I think mainly the real life stories of immigrants would be helpful (Respondent 8).

I would recommend that the asylum information be provided online in different languages. Maybe in languages of countries where big economic or war conflicts are because people will probably leave those countries. Or at least have the information in Czech and English (Respondent 15).

While not a policy recommendation, Respondent 1 summed up his feelings about the refugee integration policies: ‘The housing and integration programme is said but not in reality, written with many promises’. Respondent 1 recognized the effort the Czech government made by enacting integration policies, but also recognized that what is pledged on paper does not necessarily translate into what actually happens. The respondents generally appreciated the fact these services did exist and were grateful that the Czech government was making an effort to help them resettle.

This attention to refugee integration policy and its evolution within a relatively short period of time shows that the Czech government is committed to enacting successful integration policies. But does this concern translate to reality for refugees?

4.1. Housing Assistance

The Czech government realized refugees may need help finding a place to live. Therefore housing assistance (overseen by the Ministry of the Interior’s Unit for Integration of Refugees and Foreigners) became part of integration policy. The Unit is responsible for securing housing agreements for refugees and paying a specified sum. From 1994 to 2008, per the Ministry of Interior (2010), the Czech government provided 494 integration apartments to refugees.

While housing assistance is available per policy, in practice it did not materialize for my respondents. The majority said they were never offered housing assistance. Respondent 11 stated, ‘I was never offered housing after getting asylum. I have been in the Czech Republic for seven years and have never been offered housing. I needed it at the beginning, but I don’t need it now’, while Respondent 14 corroborated: ‘I didn’t get offered housing. Others were offered it but not me’.

29% of my respondents said they were offered housing. However, only one respondent accepted the offer, which was located far from Prague. This respondent eventually moved to Prague. The main reason for not accepting the offered housing was due to its unfavourable location. A majority of available housing is located in smaller villages and rural areas that are perceived as having limitations. One deficiency of these areas was the lack of available employment; per Respondent 4, 'We were offered housing in a small village of 100 people where there is no work'.

Resettling refugees in places without access to employment would present a barrier to integration. Respondent 14 felt he should be offered housing in the city where he already had employment: 'If you work in Prague, you should get housing in Prague. The system is hard to understand. What do they base it on – religion, colour, culture, race?' Respondent 14 took it personally that he did not receive housing in Prague saying he knew people who did get housing there and wondered whether personal characteristics played a part.

Access to education was another shortcoming in the areas where housing was offered. Since the majority of available housing is located in rural areas and small villages, attending a university is not viable unless someone is willing to travel:

When I got refugee status I wanted to continue with my studies in Prague. But finally after a long scramble, I got a 1 + 1 flat in a town approximately 40 km from Prague. They told me to be glad for that. I asked personally every city office in Prague for a flat, but none of them approved it (Respondent 12).

Respondent 12 also raised another issue about the provided housing: size. Respondent 4 complained about the size of his apartment as well – his family of three lives in a three-room apartment. We conducted our interview in his apartment, and he showed me where the family slept. The size of available housing for refugees is one area that has been mentioned in previous studies; participants in a UK study had issues with the housing being too small for their family (Ager and Strang, 2008). Another study in Britain found that overcrowding and the lack of housing available for families was a major concern for refugees (Phillimore and Goodson, 2006).

Respondent 13 found the location of available housing insufficient because of the lack of diversity in the areas where available housing is found: 'I was offered an apartment in the country among foreigners so I didn't take it'. Respondent 13 considered himself a foreigner but did not want to live in a place that was dominated by foreigners. Because housing is often available in smaller villages, these can become highly populated with foreigners. In order to integrate, Respondent 13 felt he needed to live with Czechs instead of a community of foreigners where he would feel isolated from Czech society.

In a European Council on Refugees and Exiles (ECRE) study, integration of refugees living with other foreigners was seen as problematic also. One respondent said her neighbourhood housed between four and five hundred people who were all foreigners; because of this, she believes ‘the policy of the government is one of segregation’ (ECRE, 1999, p. 56). Although the location is different – small village versus urban area – the feeling of the government segregating foreigners is the same. The Czech government considered housing refugees in integration apartments. This was discontinued amidst the realization that segregating refugees impeded integration. While intentionally segregating refugees ceases to happen, unintentional segregation continues since spaces of available housing are limited.

Some respondents found the location of available housing insufficient because of their personal inclination to live in a city. They felt living in Prague was desirable because of the social and political opportunities afforded there that would not exist elsewhere. Respondent 15 stated, ‘We left the camp and immediately decided to live in Prague. I would not live anywhere else. I am a city person and could not live in the country’. Respondent 15 is a business-owner and entrepreneur. She is socially involved with a group from her country of origin (planning parties and other social and cultural events). She was forced to migrate for political reasons and continues to support the cause while in the Czech Republic. She felt this type of social and political life would not be possible living outside Prague.

The Ministry of the Interior realizes the current housing policy is not effective. It is rethinking the policy and may change it in the future to offering money directly to a refugee who can spend it toward housing anywhere in the country (personal communication, 2008). Since one of the biggest complaints of the current housing policy is the lack of choice in where to live, this direct monetary offer could be a starting point in creating a policy that works. Monetary assistance would be helpful for refugees who wanted to live in areas where housing assistance is typically unavailable. This policy could support the integration process since refugees may feel more comfortable in a community they chose to live in.

However, this policy change would mark a shift in responsibility from the state. Under the proposed policy the state would no longer work with municipalities and much of the resettlement burden would be put on refugees. Drbohlav and Džúrová (2007, p. 72) say that one of the issues concerning migration policy in the Czech Republic is to decentralize integration efforts – ‘including involving municipalities’; the proposed change in housing policy would do the opposite since it removes the municipality from the integration process. In effect changing the policy displaces the problem from the state to the individual. The state would not have to ensure that the money was spent on housing nor would it have to find suitable housing for refugees, which lessens the state’s responsibility.

4.2. Czech Language Training

The Czech government acknowledges that Czech language skills will not only help a refugee integrate into Czech society but also be useful in procuring employment. Czech language instruction is offered free to refugees on an hourly basis. The policy in 2000 offered refugees 100 hours of individual training or 150 hours of group training over a maximum of ten months. In 2008, the Ministry of Education, Youth and Sport realized that this was not enough time to sufficiently learn the Czech language, and the policy was amended to include 400 hours of free individual training or 600 hours of free group training.

Unlike the Ministry of the Interior's role in housing provision, the Ministry of Education, Youth and Sport does not directly oversee the Czech language classes. The management and staffing of the courses as well as the creation of class material is outsourced to NGOs. NGOs typically provide refugees the course information – meeting days and times – and it is the refugee's responsibility to choose the classes that he/she can attend. In 2008, 69 Czech language courses took place in 26 locations throughout the country; of those, 32 were individual courses and 37 were group courses (Government of the Czech Republic, 2009).

Most of my respondents received their language training prior to 2008 when the group training hours were increased (none opted for individual sessions). Sixty per cent of my respondents participated in free Czech language courses. None were completely satisfied with their training.

The inadequate amount of free class time was one of the main criticisms. Respondent 4 stated, 'I had two months of Czech language school offered by the Ministry, but I stopped because I would have had to pay for more', while Respondent 14 said, 'I was given time and a little money to learn the language, but it was not enough'. Because the amount of free training was limited, respondents stopped their training since continuing meant they would have to pay out of their own pockets. Online sources show that Czech instruction typically costs around 400Kc (20 USD/13 GBP) for an individual lesson. Respondent 4 was unemployed and Respondent 14 was working two service jobs and barely able to pay his own bills; therefore, paying to learn Czech was not a high priority.

In a previous study in the Czech Republic refugees saw 'the most burning problem in the insufficient number of lessons within a course and in the fact that the language courses focus only on mastering basic Czech' (Krchová and Víznerová, 2008, p. 3). The lack of free training hours is a frequent complaint; an ECRE study found this to be the case in Austria, Denmark and France (ECRE, 1999). Compounding this is that refugees can only use the hours during the first ten months after receiving refugee status. If training is not used by then, refugees have to pay for it themselves. This time constraint hinders a refugee's opportunity to benefit from the free training because oftentimes he/she spends the early months finding housing and employment, which take precedence over

language training. Respondents 9 and 14 corroborate this, respectively: 'I started taking Czech lessons, but it was too much with work'; 'I took only one month of language training and found a job, but now I don't have enough time to take more classes. I had to choose to work or go to class, and I chose work'.

The Czech government responded to the time issue by increasing the number of available free hours of training. However, a corresponding increase in the monthly time limit did not occur. Without extending the time limit, the increase in hours may be irrelevant since some respondents did not use the free hours in the first place due to lack of time. If the monthly restriction were extended (or removed altogether), refugees would be able to better use the service; they would have time to find suitable housing and employment before deciding the best time/place to attend language classes.

In addition to the shortage of hourly training offered, respondents found troublesome issues within the classes themselves. Respondents attended classes with students having a range of Czech language skills resulting in classes with students attending their first and last day of training. Respondent 1 stated, 'The language classes should be built to the level of the students otherwise it's hard', while Respondent 13 said, 'You learn in a group with people at different levels. I would recommend that the classes find out who can come and when and have smaller groups'. Respondent 13 said people who had already taken several weeks of language training were in his classes, and this made it difficult for the students and the instructor. He said the instructor usually taught to the advanced students leaving the rest behind. The recommendation of having classes based on skill levels is an obvious remedy to this situation. Making matters worse is that instructors change; the same instructor does not always teach the same class at the same time each week. This means the instructor does not always know what the class has already learned.

Difficulties with language course material are documented in previous studies. Krchová and Víznerová (2008) found it problematic that language courses focused on learning basic Czech. One of their respondents said he did not learn Czech in ways that would help him find a job. A refugee in Austria found the same fault with her courses of learning basic, elementary German that would not be of any use in integrating into Austrian society (ECRE, 1999).

The diversity of students in the classes was another problem mentioned. Because of this, there was no common language that could be used to teach students. Respondent 2 said 'The classes were not helpful because we were put in classes with Arabic and French speakers, and we learned to write in Latin'. Respondent 10 also found deficiencies with the courses: 'I learned Czech from a textbook for Vietnamese'. The diversity of students meant it was hard to communicate with classmates as well. Another found that refugees had a harder time learning in a diverse atmosphere: 'I had terrible experiences in learning Danish... we were between 15 and 65 years of age, and all of us had different educational backgrounds and interests' (ECRE, 1999, pp. 29).

One solution is to have courses taught by instructors that also speak another language commonly spoken in the Czech Republic. Classes offered in English or Russian, for example, would be practical due to the prevalence of speakers (both Czechs and immigrants) in the Czech Republic. More advanced Czech classes could be taught and attended by those who already have basic knowledge of Czech.

Individualized instruction is also another way to resolve these issues; though it would be a more costly endeavour. Refugees are given the choice of individual versus group training with individual training having fewer free hours. All of my respondents opted for the group training because of this. With individualized training, the student and instructor would always be in sync. Courses could even be tailored to the specific person and their interests (after learning basic Czech). Specialized instruction is beneficial to refugees when seeking employment or education. This type of instruction is available in the Netherlands, for example. A refugee took the basic Dutch course and ‘also took classes on surveying created especially for him’ (Daruvalla, 2002).

The deficiency in free course hours, refugees’ lack of time (when choosing between learning Czech and working) and issues of class composition and skill levels are all barriers to Czech language training. These dimensions illustrate the dysfunctional relationship the state has with the NGOs responsible for language training. Each of the reasons mentioned by my respondents as a barrier has a simple solution: basing policy on the amount of time necessary for someone to learn Czech fluently; eliminating the monthly constraint on using the free language training; and creating classes that are based on different levels of Czech language knowledge. Again this shows a shift of responsibility and a withdrawal from service-providing by the state as the Ministry outsources language class management to NGOs. While some problems with language classes and implementation could be issues of money and/or time, other problems can be rectified by talking to refugees in the classes to find out what problems exist.

4.3. Employment Assistance

Employment assistance is offered through the Ministry of Labour and Social Affairs. Unlike the first two components of integration policy, employment assistance is offered to anyone in the Czech Republic who meets certain conditions; refugees are offered this as they are considered people who need ‘special assistance’ (Government of the Czech Republic, 2005). Employment assistance consists of retraining programmes focused on computer skills to complement existing technical knowledge and personalized counseling services.

None of my respondents received employment assistance. This is partly because they were unaware of the policy and partly because they found jobs without it. Respondent 18 said he might have used the employment assistance if not for the language barrier: ‘I didn’t use it because I don’t understand Czech

[assistance is provided in Czech]'. All of my respondents who were employed found jobs without any assistance from the Czech government. Therefore, they did not have opinions on the employment assistance aspect of integration policy.

However, an issue regarding employment did arise – the inability to find jobs that were commensurate with education level and/or professional experience. This phenomenon of downward mobility follows the trend found in more developed countries worldwide (Gans, 2009; Nawyn, 2010). 35% of my respondents experienced downward mobility, while only 10% clearly did not.

The respondents who faced downward mobility can be categorized based on employment type (or lack of) in the Czech Republic: retail employee, language instructor or unemployed. Working in retail was the main type of employment for the downwardly mobile. In each case the respondent held a highly-skilled job in his/her country of origin. Respondent 17 blamed her lack of Czech language knowledge for being unable to practice her former profession: 'I used to be an accountant [...] but because of the language barrier I cannot do it here'. Respondent 17 was interviewed in Czech for this study. Her language skills were sufficient for this purpose, but she did not have the professional Czech language skills required to work in accounting. She works in a shoe store. Respondent 18 owned a metalworking business in his origin country; he works as a convenience store clerk in Prague.

My respondents also entered the Czech job market by teaching their native language to Czechs. Respondent 1 has a Master's degree and taught French literature/philosophy and ran the Human Resources department at a university in his origin country. In Prague he teaches French to children. Respondent 10 has a Bachelor's degree and was a bank manager in his origin country. In Prague, he teaches Russian to adults.

Arguably these instances of downward mobility can be ascribed not only to language barriers but also because education and/or professional experience are not always transferable. Nawyn (2010) found the lack of recognition of educational credentials from institutions in lesser-developed countries by employers in more developed countries promotes downward mobility. She recounted a story of a Bangladeshi man 'who is a doctor [...] worked with the Ministry of Health in Africa, worked with Doctors Without Borders and he came here [the United States] and he had to work in a hotel [...] nobody is going to hire him as a doctor [...] we find that many degrees are not respected here if they are not from Europe or from the United States'; another example involved an Ethiopian refugee who was a pharmacist. He was informed about an entry-level position at a hospital; he asked about more skilled positions and was told he could consider getting certified for highly-skilled work in the future.

Compounding the language barrier and non-recognition of education and/or professional experience is the issue of discrimination. Respondents 4 and 5 had some college education and were employed in their country of origin. Respondent

4 has actively been seeking employment since he received refugee status, but says he cannot find a job because employers discriminate against him: ‘When I go to find a job they won’t give it to me. Because I don’t speak Czech, they see my brown skin and assume that I am Roma [a marginalized ethnic group]’. Gans (2009) finds that refugees in the United States who had professional degrees and experience were barred from working in their fields due to racial and/or ethnic discrimination. My data may corroborate this point – out of the 35% who experienced downward mobility, 71% were from countries outside of Europe, which introduces the potential element of discrimination. With the Czech Republic having a relatively homogenous population (roughly four per cent foreign-born), someone who is not native to the Czech Republic or Eastern European is fairly conspicuous. Racial discrimination by employers was also reported in ECRE’s study: an African refugee in Ireland felt that his education was not recognized because he was black and a Rwandan in Austria experienced discrimination from her boss because she was black (ECRE, 1999, p. 39).

Since few refugees in the Czech Republic have used employment assistance, my findings are not surprising. One reason for not using the assistance pertained to a lack of Czech language skills. To alleviate this issue, language training and employment assistance could be combined.

5. CONCLUSIONS

The Czech Republic established refugee integration policies in 1999 and revisits them annually. Features of Czech integration policies include housing assistance, Czech language training and employment assistance with a different Ministry responsible for each aspect.

Despite the good intentions of the Czech Ministries involved, oftentimes policy administration does not always have the anticipated outcome. Due to the lack of available housing and that housing that is available is located in smaller towns and villages, providing refugees with suitable housing can be problematic. Issues also arose regarding the free Czech language training. These included not enough hours to fluently learn Czech, extremely diverse class compositions and a lack of individual training. Employment assistance was either not offered or not sought out by any of my respondents; although other issues arose regarding employment.

Dissatisfaction with the implementation of the Czech refugee integration policies seems to be the case more often than not in this particular study. Respondents offered suggestions on ways to improve integration policy implementation. The Czech government has typically responded favourably when they realize integration policies are not effective and have amended them as needed. However,

more dialogue is needed between refugees and policy-makers. Often there is a disconnect between the people creating the policies and those who are living with the policy decisions. As such, more refugees should be involved in the policy-making process. If policy-makers incorporate refugees' perspectives into future integration policies, refugees can become agents in creating a governance environment that is efficient and effective.

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**USING CRITICAL PATH ANALYSIS (CPA) IN PLACE
MARKETING PROCESS: A METHODOLOGICAL
APPROACH IN THE CASE OF ROSTOCK, GERMANY**

1. INTRODUCTION: PLACE MARKETING AS A STRATEGIC PROCESS

For the last 30 years, place marketing as a strategic process has been in the spotlight, since many places globally use promotion policies to support their images, based on their distinctive characteristics and become competitive among other places (e.g. Ashworth and Voogd, 1990; Kotler *et al.*, 1993; 1999; Ward, 1998; Warnaby *et al.*, 2005; Kavaratzis and Ashworth, 2005; Metaxas, 2009; Hospers, 2011). Place marketing based on Strategic Image Management (SIM) (Kotler *et al.*, 1999, p 160), starts from the identification of place vision and the primary development objectives that have to be satisfied, including also tactical planning actions (e.g. Amdam, 2004; Strategic Plan for Prague, 1999; Glasgow Tourism Action Plan, 2002–2007). As in traditional marketing, in place marketing ‘final produced good’, which is the image of the place, must/should first identify potential target markets, the existence of distribution channels and the selection of appropriate promotional means, strategies, tactics and alternative scenarios. In this framework, several studies focus on segmentation of target markets, particularly in tourist destinations (i.e. Bowen, 1998; Yuksel and Yuksel, 2002; Litvin, 2000; Kaufman and Upchurch, 2006), the development of distribution channels (i.e. Weitz and Sandy, 1995; Chevrant-Breton, 1997; Nuttavuthisit, 2007) and specific promotion strategies (i.e. Paddison, 1993; Nel and Binns, 2002). A crucial point is that effective

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implementation of place marketing requires active involvement of public and private sector of the place, as well as their inhabitants (Insch and Florek, 2008).

The additional value of the article is the implementation of a methodological strategic planning process based on 'project' operation, in order for Place Marketing actions to be scheduled in a particular time horizon, where control or rescheduling of the plan will be effective any time. The 'project' is strongly depended on the time schedule. The time schedule is a set of dates related with the operation of the project, which records both forecasting and monitoring of project duration. According to Turner (2009), the purpose of recording these dates and times is: a) to ensure that benefits are obtained at a timescale which justifies the expenditure, b) to coordinate the effort of resources, c) to enable the resources to be available when required and d) to predict the levels of money and resources required at different times so that priorities can be assigned between projects.

2. MAIN HYPOTHESES

Based on the above, the following hypotheses are made:

H1: *The nature of Place Marketing is a strategic process, which is characterized as any strategic action in certain specified parameters.*

These are: a) design and development of identified actions, b) determination of the significance of these actions and their hierarchy and c) implementation of these actions in specific time horizon.

H2: *The design and development of Place Marketing as a 'project' has specific phases (planning, programming, implementation and feedback) in the time horizon within which the selected actions have taken place (Mastop and Faludi, 1997; Pinson, 2002).*

H3: *The development of Place Marketing requires 'entrepreneurial and organizing capacity' from local actors, especially in management and control level (Hall and Hubbard, 1998; van den Berg and Braun, 1999).*

H4: *CPA could become an effective tool of Place Marketing development.*

Following the hypotheses above, we define Place Marketing as a very important 'tool' of local development and competitiveness, which is effective when it is designed and implemented strategically. For this reason, we propose to use Critical Path Analysis (CPA), which has the potential to satisfy the above hypotheses, having been applied in various cases of design and scheduling (e.g. Charnes *et. al.*, 1964; Berztiss, 1980; Anderson and Hales, 1986; Friedman and Seaton, 1998; Saidi, 2009).

3. USING CPA IN PLACE MARKETING

CPA is a mathematical procedure that calculates a project's schedule. Taking each action in turn it first calculates how quickly the action can be accomplished – its early start and early finish dates. Once all these dates have been calculated, the project finish date can also be determined. With this finish date known, CPA can then calculate how slowly each action can be accomplished (late start and late finish dates). Once all this information is known for each action, CPA will also calculate the slack (or float) of the task. The following values need to be calculated (table 1): ES = Early Start, EF = Early Finish, LS = Late Start, LF = Late Finish, TS = Total Slack.

Table 1. CPA values

ES	d (duration in days)	EF
	A (Task name / activity code)	
LS	TS	LF

Source: authors' elaboration.

As duration (d) we mean the time required to do the work. It is common to treat a work element's duration as a fixed given. For some, it is dependent on external factors beyond the control of the team. Once the work starts, but before it finishes we can estimate the remaining duration. This may be equal to the planned duration less the time since the activity started, or we may re-estimate remaining duration based on the knowledge gained from doing the work so far. More specifically, CPA is based on identification of three basic factors: a) *Hierarchical presentation of activities*: Characterizes each activity with a particular name (code), b) *Immediate predecessor*: Presents and distinguishes primary and secondary activities and c) *Time horizon*: The time of each activity to be finished. CPA has four phases of development: Planning, Programming, Implementation and Feedback. More specifically, in a hypothetical scenario of Place Marketing process, these phases are the following:

Planning: The first step is the creation of the Executive Management Group (EMG), which will take the responsibility to plan and perform the Pilot Marketing Plan. The crucial point is that the effectiveness of the whole project is based on the planning phase. Any kind of steps delay means delay of the following phases and consequently delay of the whole project. In our scenario, the overall time horizon of this phase is *120 working days*, which includes primary and secondary actions.

Programming: In this phase, the EMG has to schedule a number of core actions that need to take place before the phase of implementation. Programming requires brainstorming methods and discussions between the participating actors. In this case, the overall time horizon of this phase is *60 working days* that include primary and secondary actions.

Implementation: This is the promotion phase. The time horizon of each action is potential time and mainly concerns the time schedule of these actions. The phase of Implementation is the longest one. In our scenario, the overall time horizon is almost *175 working days* that include primary and secondary actions.

Evaluation – Feedback: It is related with the evaluation of the actions that take place in the phase of the implementation. The main aim of this final phase is the making by EMG of final decisions in order to continue the programme by preparing the ‘Official Place Marketing Plan’, or to reject the whole effort. The umbrella of this process is the vision of the place and the major development objectives. EMG needs to implement a flexible, innovative plan, which is in accordance with the evidence. In other words, it is necessary to provide an official plan that meets the demands of the potential target markets on the one hand and place development objectives on the other. In our scenario, the overall time horizon of this phase is almost *55 working days* that include primary and secondary actions.

4. CHOOSING A PLACE MARKETING MODEL: THE ‘8PS’ BY MORRISON

Essentially, the marketing mix models range from the traditional model of ‘4Ps’ (product, price, place, promotion) by Kotler (1986) and its performance in place marketing. Moreover, the model of ‘7Ps’ is evaluated (Ivy, 2008; Constantinides, 2002; Martinez-Caro and Roemer, 2006). This study proposes the model of ‘8Ps’ (Morrison, 1999) (product, partnership, people, packaging, programme, place, price, promotion), which is primarily used in tourism, but it may be applied in other sectors as well. The choice of this model was dictated by the following reasons: a) in relation to the model of ‘4Ps’, which is clearly a business model, the model of ‘8 Ps’ is more detailed and includes parameters such as ‘partnership’, ‘people’ and ‘packaging’, which are essential for the successful implementation of a place marketing plan, b) in relation to the ‘7 Ps’ model, it is more representative as it focuses only on the services sector, since the promotion of a place image is much more complex in design and implementation c) region marketing, due to its specificity, in order to be effective requires cooperation among local actors, and d) this model was used in four European regions within the research programme *CultMark* with considerable success, and therefore we argue that this experience has a great added value to the relative regions, always taking into consideration the special characteristics and the dynamics of each region (Deffner and Metaxas,

2006). Acting methodologically we should incorporate the phases of ‘8 Ps’ model into the development of CPA. The ‘8 Ps’ model should be integrated functionally and temporally in similar stages of CPA development in order to design and implement specific actions at specific time horizons, without time delays to cause problems to the entire implementation of the project.

5. ROSTOCK IN BRIEF

Rostock was chosen as a case study for the following reasons. Firstly, Rostock participated in European programme *CultMark*, which provided a substantial opportunity of studying the region deeply. Secondly, after a completely new start in the wake of the political change of 1989 the economy of Rostock is now on the right track. The region’s areas of economic competence include: maritime commerce, logistics and transport infrastructure, food technology, renewable energy, bio-medicine, bio-technology and tourism.

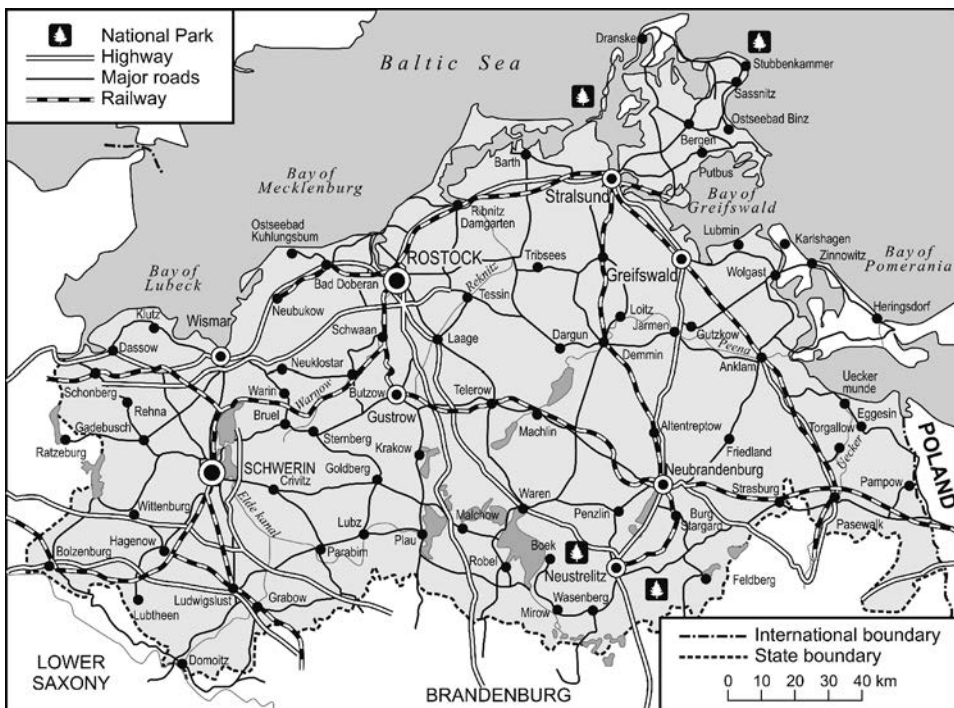


Fig. 1. The Federal State of Mecklenburg-Vorpommern
Source: www.mapsofworld.com/germany/ (10.11.2015)

The basic features of culturally-based city marketing development dynamics in Rostock are presented in table 2. These would enable policy-makers to make comprehensive decisions with regard to the development of place marketing. Using SWOT analysis particular determinants, related to Rostock's *internal* and *external environment* and based on them, the image of Rostock as a 'final provided good' is obtained. This combination reflects the development of two primary production sectors: *culture* and *business* (figure 2). The combination of activities in common between these sectors is difficult, but consists of the overall concept of the competitiveness of Rostock and tourism sustainability. Rostock has to invest in market research and target market segmentations. The city has also to develop its promotional policies in two geographical areas. The first area covers the Baltic States region, in which Rostock tries to maintain its position and dominance among other similar cities, and the second area is Western Europe, mainly, and Europe as a whole (CultMark, 2004a).

Table 2. SWOT analysis for Rostock

Strengths	Weaknesses
<ol style="list-style-type: none"> 1. High accessibility and centrality of location (in E.C. terms) 2. Substantial cultural infrastructure 3. Large local market (urban agglomeration with potential of supraregional significance) 4. Ideal hotel and host infrastructure 5. Museum with a rich stock in its storehouses, first class exhibitions 	<ol style="list-style-type: none"> 1. Not marked cultural identity 2. Too weak tourist industry 3. Inadequate place-promotion and tourism-development policies 4. Relatively unfavourable climate/weather conditions 5. Political mistakes in culture and tourism development policy
Opportunities	Threats
<ol style="list-style-type: none"> 1. Globalization, European integration and new emergent markets 2. Participation in place and thematic networks (national and international e.g. CultMark) 3. Public-private partnerships and new governance 4. E.C. and national funds 5. Technological developments in support of city marketing 6. Integration of the German economy bridging east-west divide 	<ol style="list-style-type: none"> 1. Increasing place competitiveness 2. Reduction of funds available (local, national, E.C.) 3. Institutional inflexibility (lack of PPPs) 4. Unfavourable macroeconomic conditions 5. Politically imposed depreciation of the rich cultural infrastructure, repeatedly wrong priority selection 6. Mismanagement, lack of management and fundraising competence, ignorance of E.C. grant opportunities and international networking

Source: authors' elaboration.

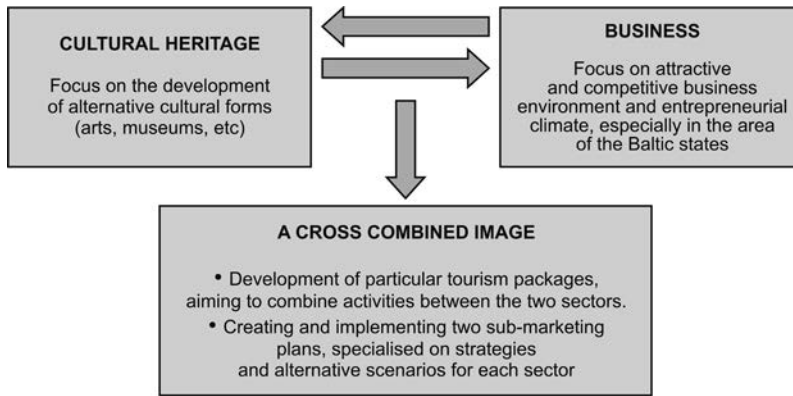


Fig. 2. Shaping the final provided good of Rostock
Source: authors' elaboration

6. CRITICAL PATH AND MORRISON'S '8PS' MODEL IN THE CASE OF ROSTOCK

The analysis of the internal environment of Rostock shows dynamic development of two axes, business and culture. The city might be a very attractive destination for FDI, due to its important geographical position (very close to the region of the Baltic countries). The above data derive from studies and field investigations conducted during the research programme CultMark (2004a, 2005b).

Table 3 presents activities of the *planning* phase of CPA. In the three columns of the table are presented the codes of each action, from the total 12 actions (A, B, C, D ... L), the immediate predecessor refers to the codes of the actions which must necessarily precede (primary actions) for the subsequent implementation of other actions (secondary actions) and the last column presents the duration that is potentially required for the completion of each action, expressed in days. The aim is to identify the actions (and their duration) which have to be developed as soon as the previous one is completed and the actions that should be developed in parallel with the primary one. The chosen actions of the present phase are considered general because they are the first actions that represent the overall planning framework within which will be realized the other phases of the following actions. Thus we could say that these actions may be common to any region wishing to develop a marketing plan regardless of the particular features that it has. The basis for the selection of these actions is the specificity of the characteristics of each region and in this case we refer to the characteristics of the city of Rostock. It is noted for example that action C refers to the analysis of the competition in the

Baltic region and in the wider region of the Western European countries. The choice of this action is related to the geographic location of the city of Rostock.

Table 3. Planning phase of CPM

	Activities	Activity code	Immediate predecessor	Time (days)
1	Composition of the executive management group (EMG) (Morrison model: partnership and people)	A	–	5
2	Analysis of competition in regional and national level	B	A	10
3	Analysis of competition in Baltic's area and the wider West European countries	C	A	15
4	Identification of the 'final provided good' (Morrison model: product)		A	10
5	Creation of Culture and Business 'packages' (Morrison model: packaging and pricing)	E	D	15
6	Re-evaluation of the selected target markets based on their characteristics analysis – Choose the appropriate sample (internal environment)	F	D, E	10
7	Re-evaluation of the selected target markets based on their characteristics analysis – Choose the appropriate sample (external environment)	G	D, E	10
8	Selection of the distributors for each part of the 'final provided good' (Morrison model: place)	H	F	10
9	Evaluation of the selected strategies and tactics per target market (internal environment)	I	F	10
10	Evaluation of the selected strategies and tactics per target market (external environment)	J	F, I	10
11	Evaluation and final selection of the promotional means (Morrison model: promotion)	K	D, E, I, J	10
12	EMG meeting 1	L	K	5
End of the first phase				120

Source: authors' elaboration.

The actions of the Planning refer to the composition of the wider framework within which the actions of the next phases will be developed. In the planning phase as in the following ones the '8 Ps' model is adapted depending on the type of the action. Therefore, for example in action A the composition of the EMG requires the development of *partnership* between people – more specifically between the groups that participate in this action (i.e. local decision-makers, citizens, firms etc.), while action H is related with *place*, concerning the distribution channels of Rostock's image. Finally, each action is potentially planned within a time horizon of a certain number of days. The time horizon of each action is determined by the type of the action and by the degree of difficulty regarding its implementation. For example, action E is scheduled to be implemented in 15 working days, because it requires innovative design of specific 'cultural and business packages' which will be the main components of the composition of Rostock's image as a final provided good. In figure 3 are presented the actions of the Planning and the Critical Path is created between primary and secondary actions. Of the 12 actions, 8 are primary, so their development requires completion of the preceding ones, and 4 are secondary, which means that they can be developed at the same time as the others. Following figure 3, we enter an ES value of 0 for action A that has no predecessor. For each of the following actions, their EF value will be calculated from ES value plus the activity duration (for example; action E has ES = 15 days derived from D and EF = 30 days (ES = 15 days + E (d) = 15). Actions B and C have a common predecessor, the ES value for both of them will be the same as the EF value for their common predecessor, action A (where EF = 5 days). Similarly structured are the actions until the last one. On the other side, working through the network (figure 2) from right to left, the backward pass calculates late start and late finish dates for each action. To calculate slack values for each action, use the formula: $LS = LF - ES - \text{Duration}$. For example, the last action of the *Planning* phase is L with duration (d) 5 days. Following the formula $TS = LF - ES - \text{Duration}$ we have: $LS = LF (75 \text{ days}) - ES (70 \text{ days}) = 5 \text{ days} - (d \text{ of L action}) = 5 - 5 = 0$.

The same procedure is applied in all phases of CPM. Actions A and D are considered important because as soon as they are implemented the rest of the actions will take place. And this is logical if we consider that action A is the starting point of planning, while action D refers to the composition of the final provided good regardless of the pricing, the distribution, the promotion and the evaluation of potential target markets. All phases are completed with the meeting of EMG which evaluates the entire progress of the phase per action, and generally prepares the ground so as to continue to the next phase.

Similarly are synthesized the following phases of CPA, *Programming*, *Implementation* and *Feedback*. Throughout these phases the project ends at having a time horizon of 410 days, of which 220 are related to primary actions and 190 to secondary actions. Particularly, in *Programming* the actions that will take place in *Implementation* are programmed. Particularly, during the programming

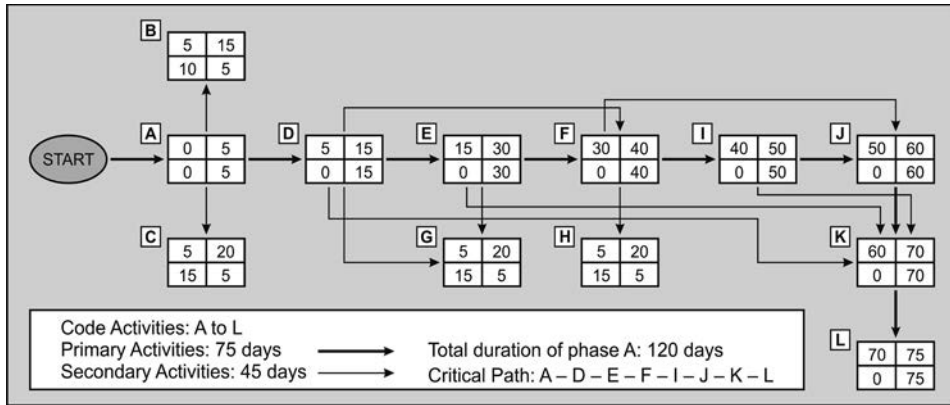


Fig. 3. Critical path diagram of the 1st phase
 Source: authors' elaboration

stage (table 4, figure 4), the evaluation and the organization of the procedures related to the communication take place the analysis of target markets, the actions of supporting the image of the city and the creation of business and cultural packages. Attention should be paid to action R, whose implementation requires the development of all previous phases. The programming phase is the shortest regarding the time compared to the other phases of the project and it is the one that sets the framework and the axes on which the action will take place in the next phase, *Implementation*.

Table 4. Programming phase of CPM

Activities		Activity code	Immediate predecessor	Time (days)
3rd phase: Programming (13–20)				
13	Selection of the appropriate communication process (Morrison model: promotion)	M	L	10
14	Organising the focus group analysis (internal environment – phase A – 4 groups) (Morrison model: programming)	N	L	5
15	Organising the focus group analysis (external environment – phase B – 4 groups) (Morrison model: programming)	O	L, N	5
16	Creation of the appropriate questionnaire (Morrison model: programming)	P	N, O	5

Activities		Activity code	Immediate predecessor	Time (days)
17	Creation of a mini advertising and public relations plan (Morrison model: promotion)	Q	P	10
18	Positioning of the culture and business packages to distributors	R	N, O, P	15
19	Creation of a guide-mini seminar to the participant groups and the selected distributors	S	R	5
20	Group executives meeting 2	T	S	5
End of the second phase				60

Source: authors' elaboration.

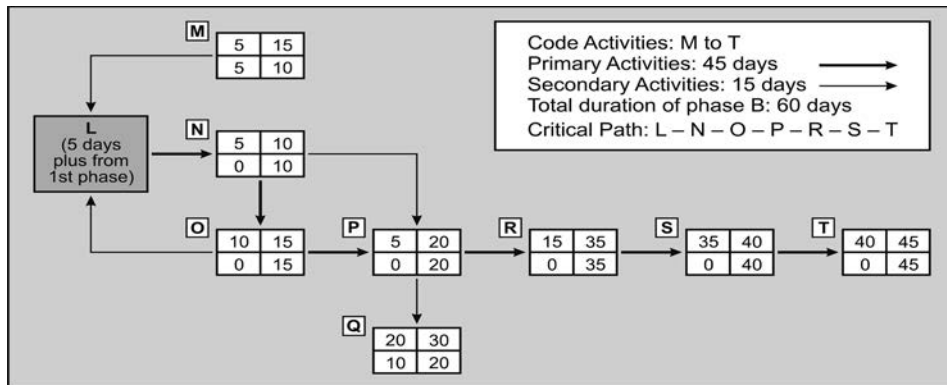


Fig. 4. Critical path diagram of the 2st phase

Source: authors' elaboration

Implementation phase (table 5, figure 5) is the executive part of the overall project and therefore it requires more actions and time. During this phase several actions are developed which are planned in the previous phase. For this reason, it lasts longer than the others, that is to say 175 days (100 primary and 75 secondary actions). The main feature of *Implementation* is that almost all actions are associated with the promotion of Rostock's image in continuous and repetitive initiatives such as advertising, participation in various events at national and European level, public relations programme, media etc. Actually, during this phase tactical planning is developed (McClamroch *et al.*, 2001; Petrakos *et al.*, 2004), because it includes the implementing of actions throughout the implementation process.

Table 5. Implementation phase of CPM

Activities	Activity code	Immediate predecessor	Time (days)	
3 rd phase: Implementation (21–36)				
21	Implementation of focus group analysis [internal environment]	U	T	5
22	Implementation of focus group analysis [external environment]	V	T	5
23	Primary market research (using questionnaire)	W	T	25
24	Creating or improving Web Site (Morrison model: promotion)	X	T	10
25	Advertising action 1: Media (Morrison model: promotion)	Y	X	10 (creating scenarios)
27	Advertising action 3: Newspaper (Morrison model: promotion)	AA	Y	10 (creating scenarios)
28	Advertising action 4: Magazines (2) [foreign] (Morrison model: promotion)	AB	Z	10 (creating scenarios)
29	Participation in an event (i.e. exhibition) [national level] (Morrison model: promotion)	AC	Z, AA, AB	10
30	Participation in an event (i.e. exhibition) [European level] (Morrison model: promotion)	AD	AC	15
31	Implementation of P/R activities (Morrison model: promotion)	AE	AD	10
32	Participation in a TV programme – documenter (Morrison model: promotion)	AF	AD	15 (creating scenario)
33	Info kiosks and info centers (Morrison model: promotion)	AG	AF	15
34	Creation of VIDEO – DVDs (Morrison model: promotion)	AH	AF	10
35	Creation of Investment and Tourist guides (Morrison model: promotion)	AI	AF	10
36	Group executives meeting 3	AJ	AI	5
End of the third phase				175

Source: authors' elaboration.

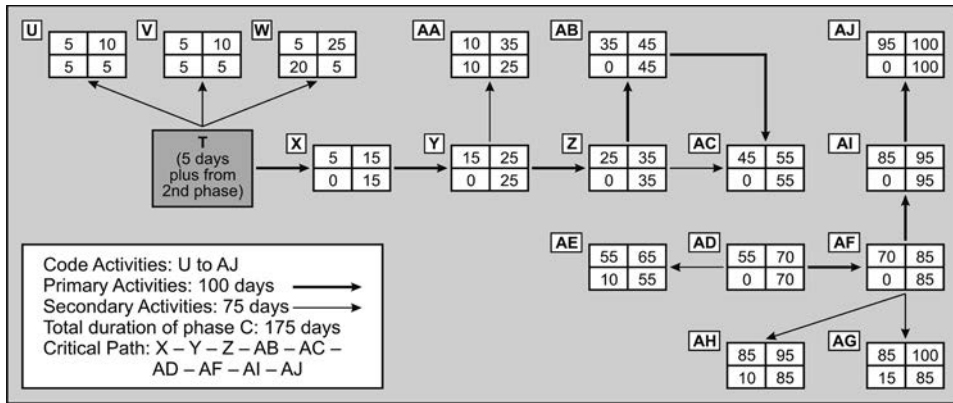


Fig. 5. Critical path diagram of the 3rd phase
Source: authors' elaboration

Feedback is the last phase. In this phase, during which the whole progress of the project ends, EMG is required to evaluate, support or reject the progress and the effectiveness of the actions that have taken place, particularly during the implementation phase (table 6, figure 6). In order to reach the final decisions, the data and the reports that have been collected will be evaluated, under the condition that firstly the appropriate databases are created. Based on this process, the experts and the decision-makers have the opportunity to possess organized and measurable important data so as to determine and plan the development of their areas in the future.

Table 6. Evaluation phase of CPM

4 th phase: <i>Evaluation and Feedback</i> (38–44)		Activity code	Immediate predecessor	Time (days)
38	Evaluation of the advertising and public relations plan	AK	AJ	5
39	Evaluation of the selected communication process	AL	AJ	5
40	Creation of a database	AM	AJ	5
41	Data analysis	AN	AM	10
42	Decision making analysis, based on the outcomes and the anticipated profits per action	AO	AN	10

Table 6 (cont.)

4 th phase: <i>Evaluation and Feedback</i> (38–44)		Activity code	Immediate predecessor	Time (days)
43	Final decisions	AP	AO	5
44	Preparation of the official programme (the level of its difficulty depends on the evaluation of the outcomes derived from pilot programme)	AQ	AP	10
	End of the 4th phase			55
	Whole project time horizon			410
	Primary actions			220
	Secondary (parallel to primary)			190

Source: authors' elaboration.

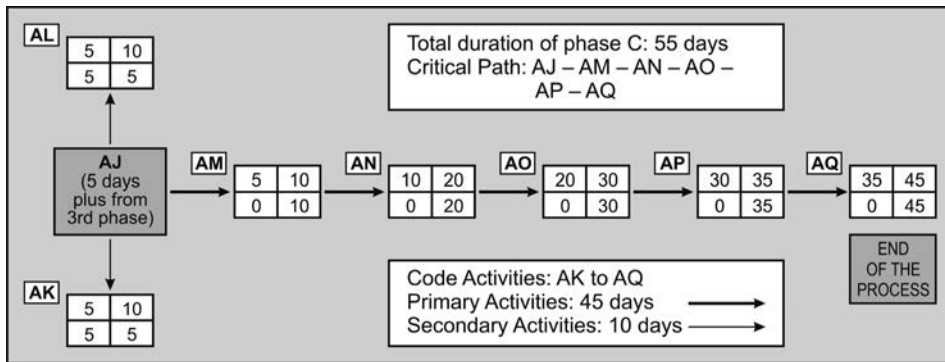


Fig. 6. Critical path diagram of the 4th phase
Source: authors' elaboration

7. DISCUSSION AND CONCLUSIONS

CPA is based on the fact that planning and implementation of a Place Marketing Plan is a strategic process, characterized by specific phases, actions and evaluation methods, which are fitted and controlled in a specified time horizon. In this context, it can guarantee the successful implementation of place marketing thus providing the character of a *project*, during the progress and the completion of which there will be no randomness, procrastination and important omissions or errors.

However, in this study it is suggested that successful development of CPA is related to the capacity of EMG and its implementation by local decision-makers. The adoption of CPA has an innovative and pioneering character in Place Marketing process, supporting directly the effective contribution to the economic development of the region that applies it. Of course the whole proposal of CPA has a major limitation. The model of CPA does not take into account any of the contingencies of political, social, institutional and economic nature which affect strategic planning or policy-making in real life. This particular limitation will be a subject of future research.

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APPLICATION OF PROSPECTIVE STRUCTURAL ANALYSIS FOR IDENTIFICATION OF STRATEGIC VARIABLES IN THE FUTURE DEVELOPMENT OF BANEH CITY IN IRAN

1. INTRODUCTION

The increasing complexity and uncertainties of future developments in cities as well as the extended range of key factors from local to global levels make necessary adopting a new approach in urban planning. Futures research methods are increasingly applied in long term city planning. Baneh as an important city of Iran in Kurdistan province near the Iraq border has a special location and plays a key role in trade and business. The alternative futures of the city are shaped by a diverse set of variables from local to international levels and hence planning for the future is a challenge. In this research structural analysis is applied to assess the interrelationships of the underlying factors with respect to the long term developments of Baneh.

Futures studies is a knowledge area that opens eyes to events and the likely opportunities and threats. It alleviates ambiguities, doubts and concerns, enables the society to make smart choices, and makes clear where we can go (explorative futures) and where we should go (normative futures) and what could be shortcuts to desired futures. In short, futures studies should be regarded as an endeavor towards shaping the future in a conscious and proactive manner (Malekifar, 2009; Alizadeh *et al.*, 2008). Futures studies means taking necessary actions for 1) interpreting the past; 2) understanding the present; 3) making decisions and

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taking action at present; and 4) balancing present and future use of resources (Bell, 2003). The most important objectives of futures studies that are endorsed by most professional futurists are identification, assessment, test, and suggestion of possible, probable, and preferable futures. Today a growing number of organizations engage in futures studies and encourage the institutionalization of this field of profession. That is because futures studies potentially contribute to building some inspiring visions and uncover ways to implement them.

2. URBAN PLANNING AND SYSTEM DYNAMICS

Urban planning is a recognized academic discipline which has evolved throughout history. Both its theory and practice have changed to fit developments in cities and urban characteristics, urban economy, and city environment to the extent that it now incorporates a rich base of approaches, models, and methods which correspond to specific circumstances and problems. From the middle of the 20th century, strategic planning and systems thinking were integrated in the scientific models of urban planning in order to better encounter some rapid and radical changes in built environments and emerging urban challenges. Futures studies could be regarded an evolution of strategic planning and system thinking that builds upon theoretical base of other similar disciplines and tries to address the increasingly complex environments and their related planning and management issues. Roney (2010), for instance, demonstrates that strategic planners and futures methodologists, in a complementary fashion, ‘comprise communities of “engineers” who apply theory from the social and physical sciences in order to develop methods that aid management in making anticipatory decisions regarding resources deployment’. Futures studies and research entered the regional and urban planning in the last decades of the 20th century. In Europe, and in particular in Sweden, futures studies were widely accepted and applied in urban planning. Khakee is among the first scholars who applied futures research widely in spatial and urban planning. He incorporated futures thinking in several cities in Sweden and developed also a number of models to integrate the futures approach in city planning. Academic research in recent years shows an increasing trend in terms of publications that combine futures studies and urban planning (Khakee, 1993, 2010).

Moreover, Ratcliffe and Krawczyk (2011) are two other futurist experts who have done a great deal of research focused on the futures research in an urban planning framework. Krawczyk’s (2006) PhD dissertation addresses future thinking in city planning processes with Dublin as the case study. She demonstrates the use of futures methods and models throughout the different steps of city planning system. Today a new generation of city models are ‘viewing such

systems as being continually out-of-equilibrium with a dynamic driven from the bottom up' (Batty and Marshall, 2012).

In Iran the application of futures research, and in particular *scenario planning*, is emerging (Motlagh, 2013). However, if we consider strategic planning as the historical background one can compile a list of application of strategic planning concepts and methods in city planning. City Development Strategies (CDS) are urban plans that apply strategic planning concepts and aim to provide long term visions for cities. Such plans have been developed for several major cities across the country and eventually implemented. Nader Zali (2010) has produced a PhD dissertation. He discusses future developments based on 'national perspective and province development foundational theory by using strategic management approaches relying on scenario- based planning models'. Moreover, he uses scenario wizard software in regional planning. In addition, researchers from AtiNegaar Think Tank have done a commercial in-depth research project of spatial planning based on foresight and scenario planning methods for Hamedan Province in Iran.

3. STRUCTURAL ANALYSIS

Prospective structural analysis, as a common futures research method, has been developed and widely applied by French scholars. System approaches emerged from the pioneering works of Forrester in industrial and urban dynamics in the 1960s. Such research projects provided enough justification for structural analysis. The reports by Club of Rome, and in particular *Limits to Growth*, drew wide public attention to system dynamics, even though the conclusions of such models are still fiercely debated among professional futurists. In order to address the whole system and make sense of the evolution of multiple and homogenous quantitative and qualitative variables, the structural analysis employs *matrix and chart as tools of representation and visualization*. This particular method of system dynamics has been applied to diverse case studies from water to transportation to energy systems. Structural analysis has been used to uncover the factors which guide nuclear energy sector in France (Arcade *et al.*, 2009). Iranian futurist scholars have also widely applied structural analysis to develop multiple scenarios for the national science and technology roadmap (Motlagh, 2013).

The method of structural analysis aims to identify the key factors in the global dynamics so as to receive insights from participants and to encourage reflection in the group on the complex and unpredictable long term evolution of a system. It sheds light on the configuration of the system under study and 'linkup ideas'. The major advantage of this method is finding the web of interrelations among variables and eventually surfacing the key factors. It could be used, qualitatively, to study diverse systems.

Futures Research Methodology, published by the Millennium Project, provides a manual on the history, step by step procedure, and case studies of structural analysis applications (Arcade *et al.*, 2009). Structural analysis follows a step by step procedure as described below.

Step One: Collecting the list or inventory of variables.

Step Two: Establishing the web of interrelations.

Step Three: Identifying key factors.

In the first step, based on interview with experts and brainstorming sessions, an inventory of variables is produced which is ideally exhaustive and descriptive of the whole system covering both internal and external aspects. After setting the elements of the system the task in step two is to bring to light the web of interrelations in terms of influence or dependence among those elements. It is recommended to group the elements or variables into distinct categories and provide a homogenous list. A common grouping suggests splitting variables into a) internal system; b) specific context; and c) global environment. Structural analysis put the variables in rows and columns of a matrix and then they were crossed to assign influence scores ranged from 3 (strong) to 1 (weak) to indicate the intensity of influence that the variable i has on the variable j . If, based on qualitative perceptions, there is no influence between pairs of variables the corresponding element in the matrix remains empty and if a potential influence is deemed appropriate the letter P is inserted (see figure 1). At this stage only direct influence is determined and recorded. The think group is recommended to focus on the most direct and not intermediary relations in this stage. If the influence of variable i on j goes via k the researcher should put the score of influence from k to j . This step in itself helps to redefine the system, revise the list of variables, revise the grouping and establish a common language for better collaboration among researchers. Filling rate of matrix is often nearly 20% yet the internal system block of variables has a higher rate than average. All variables in the systems are visualized in an influence x dependence plane. Adding up the scores for each row and column indicates how much influence or dependence each variable has in the whole system. Step 3 addresses the feedback and loops which are essential notions in system dynamics. A direct influence from a variable onto another could be weak yet it might be the case that its global influence may increase tenfold through particularly strong variables. Therefore structural analysis also takes into account the indirect propagation of the variables' influence in the web of interrelations. It can be shown that if we raise the structural matrix to the power of successive values from 2 up to n then we obtain a new matrix in which each element in the matrix incorporates both direct as well as indirect (feedback and loops) relations among variables. Human mental capacity is limited to address this step of structural analysis and hence a software called MICMAC is used. The ranking of variables generally becomes stable in less than 9 multiplications of the original matrix (Godet, 2006).

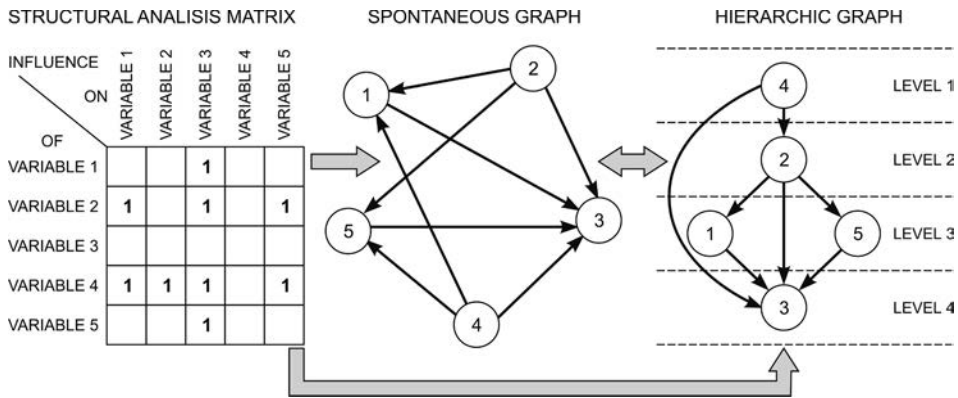


Fig. 1. The structural analysis matrix and its graphs
Source: Arcade (2000). Used with permission

4. DATA AND RESULTS

Baneh is a small city in Iran with a population of nearly 85,000 which is located on Iran-Iraq border. Despite its small size, this city is remarkable among Iranians because of the inexpensive luxury products that are sold in its markets and shopping centres. In recent years it has turned into a hub for trading and importing goods to Iran from countries such as China, Taiwan, Indonesia, Turkey, and some European countries. Traders purchase relatively cheap goods and import them to Iran via Iraq border. Trading business has made a huge impact on the city and has boosted the pace of its development. This big change has resulted in transforming many residential and public premises into retail shops and business offices. Moreover, a palpable change can be seen in the economic and social aspects of life in the city. The rapid rate of change brings to light a multifaceted puzzle and a number of questions:

1. Given the large scale changes in city developments what could unfold in the long-term future of Baneh?
2. What could be the variables that play some role in the future development of this city?
3. Which variables are more strategic and could be subject to either monitoring or manipulation?

Our study tries to address these questions. Findings provide a preliminary set of insights that help us make better sense of potential answers.

The inventory of variables was elicited through a step by step process. In the first step environmental scanning was used to identify the most important issues with

respect to the city that were already mentioned in oral and written sources. Variables such as incoming businesspersons and other related tourists; incoming *smuggled* cheap products that often are not manufactured inside Iran; and the growth of investment in the city were among the most significant problems and issues surfaced in this step.

In the second step, the resources in the city development literature were studied. A crucial insight was that in urban planning and city geography, all the relevant variables are grouped based on different categorization logic. In one of the common approaches, factors are categorized in different spatial levels which usually include local, national, and global levels. Yet in other approaches variables are grouped into different topics such as economic, natural, and cultural factors. However, taking into account the border geography of Baneh which implies that the city development will be shaped by incoming, often smuggled, goods from abroad, the spatial approach was used to include all relevant factors from local to international levels. Next a questionnaire was designed and distributed among a pool of experts, asking them to both validate the listed factors and make suggestions on all spatial levels. The pool of experts was composed of people with significant involvement in both the practice and theory of city development, such as: Baneh municipality managers and professionals (5 persons); Baneh city council members (5 persons); Baneh governor office professionals (5 persons); professional graduates of related academic disciplines such as management, economics, social sciences, and political science (20 persons); and professional graduates of geography and urban planning (15 persons).

The questionnaire was sent to the respondents both in print and online version. For the online version Google Docs free service was used. The online questionnaire was also promoted on a website specifically designed for and updated on futures studies and urban planning: <http://www.futureplan.ir>. The online questionnaire was also sent to more than 100 experts who were members in social networks such as Facebook (popular yet censored in Iran, people use anti-filter applications to log in), Cloob.com (popular and government approved), and IrExpert.ir (popular and government approved). The number of responses to online questionnaire from social network members was quite low with only 5 persons filling it out.

In the third step and after receiving no more suggestions and feedback on the inventory of relevant variables, the screening process began. As a result 54 variables from local, national, regional, and international levels affecting the city development of Baneh were listed.

In the fourth step a select group of 5 experts and city professionals adjusted the list to 52 items and judged the crossing scores of variables in two half-day workshops. After the numerical elements of the matrix were determined it was then used as the input to the MICMAC software and the results were analyzed. The list of 52 variables grouped in four categories at international, regional, national, and provincial levels and abbreviations used in the MICMAC software are shown in tables 1 and 3.

Table 1. 52 variables grouped in four categories at international, regional, national, and local levels

International	economic sanctions, improvement of foreign relations, economic and political ties between Iran and East Asian countries, US dollar exchange rate fluctuations, gold and oil prices fluctuations, satellite TV channels, global security, improvement of global transportation system, natural future of the world
Regional	stability of Arab governments, Middle East security, stability of Iraq government, improvement of Iraqi transportation network, Iraqi Kurdistan security, Iran-Iraq relations, Iran-Iraqi Kurdistan relations, improvement of trade relations between Iran and its region, cultural- ethnic- linguistic ties between people on border sides of Iran-Iraq and Iran-Turkey, development of regional transportation companies, investment by large regional corporations
National	development of suitable customs, laws and regulations, building infrastructures and improving customs management system, national planning for management of border local markets, national TV and media and news coverage of the city, political approach of government to areas populated by the Kurd ethnic group, earmarked budget for border areas, national product, national aggregate demand, improvement of national transportation network, national security, borders security, political stability of Iran, importance of tourism industry in national development policy, spatial planning
Local	building tourism infrastructure, city perspective and fabric, city and provincial transportation, local media, city management system, people training courses for good treatment of tourists, facilitation of investment, natural potentials of the area, building factories and industries in the area, city and provincial management, relative situation of Baneh city, development of Baneh, job creation, supervising the budget spending, promotion of natural tourist attractions, amount of goods flowing to the city, number of incoming tourists to the city, quality control of input goods

Source: authors' elaboration.

5. INTERPRETATION OF THE INFLUENCE X DEPENDENCE CHART AND TYPOLOGY OF VARIABLES

Visualization of the web or graph of interrelations (see figure 4) could be done in a chart in which horizontal and vertical axes are scaled to increasing intensity of respectively dependence and influence of factors based on their total scores. The cloud of points as shown in figures 2 and 3 can be divided into distinct categories with different roles in the system's global dynamics.

Determinant factors (located in north-west part). These are very influent factors. Depending on how much we can control them this set of variables determines inertia or movement of the system. Often environment variables are among them since they strongly condition the system. For the case of Baneh city determinant factors are: natural future of the world, political stability of Iran, national security, borders security, political approach of government to areas populated by the Kurd ethnic group, national planning for management of border local markets, Iran-Iraq relations, national aggregate demand, development of suitable customs laws and regulations, city and provincial management.

Relay factors (located in north-east part). These are both very influent and very dependent. Also called factors of instability because have a 'boomerang effect' and can either amplify or forestall any initial impulse in the system. Only a few, precisely 3, variables are seen in this part of the plane. Moreover, *earmarked budget for border areas* as a variable is located between relay and depending parts of the chart and it might be the case that if we produce the indirect plus direct matrix in the next step of structural analysis it will move to the part of relay variables.

Excluded (located in south-west part). These are variables with little influence and little dependence. Apparently they are 'out of line' with the system because can neither stop a major evolution nor take advantage of it. However, a distinction could be made within this group of factors. Disconnected variables are located near the origin of axes and we can remove them from the global dynamics and secondary levers, above the diagonal, with a degree of influence, they could be used as possible accompanying measures. For the case of Baneh city the cloud of points in this part of the chart are distributed almost uniformly. It is worthwhile to note that *city management system* lies here and therefore is an excluded factor from the whole system. This may be due to the fact that the future of the city will be shaped by some higher level variables that are effectively controlled by the central government. Nonetheless, it is a secondary lever and is rather influent than dependent. The list of disconnected variables that could be safely discarded consists of: satellite TV channels, improvement of global transportation system, promotion of natural tourist attractions, people training courses for good treatment of tourists, supervising the budget spending, improvement of Iraqi transportation network, US dollar exchange rate fluctuations, and local media.

Depending (located in south-east part). These are exit variables of the system, also called *result variables*. Their location on the plane indicates little influence and high dependence. Therefore, they are highly sensitive to the influencing factors. As expected most of them are related to the local level of the Baneh city and only a few factors from the international and national level factors belong to this part of the chart.

Another type of variables is also recognized in the influence \times dependence plane which are located in 'the centre of gravity'. These are *regulating variables* and may

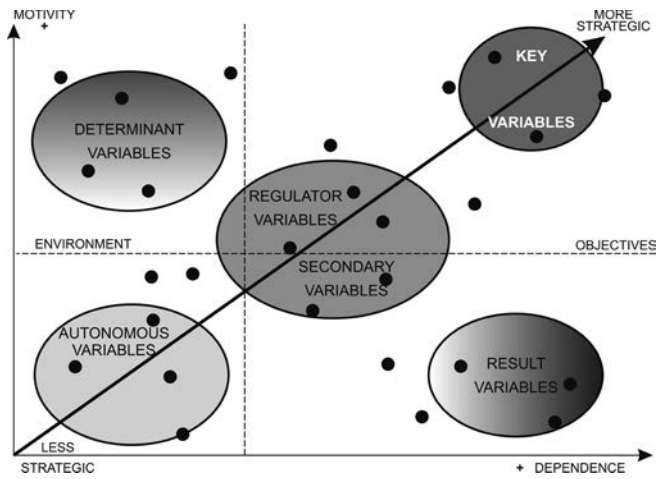


Fig. 2. Typology of variables in the influence x dependence plane
 Source: Ambrosio Albalá *et al.* (2009). Used with permission

play alternatively the role of secondary levers, weak objectives, and secondary stakes. In the system of Baneh city only a few factors qualify to be regulating ones which are: Iran-Iraq relations, building infrastructures and improving customs management system, and development of regional transportation companies.

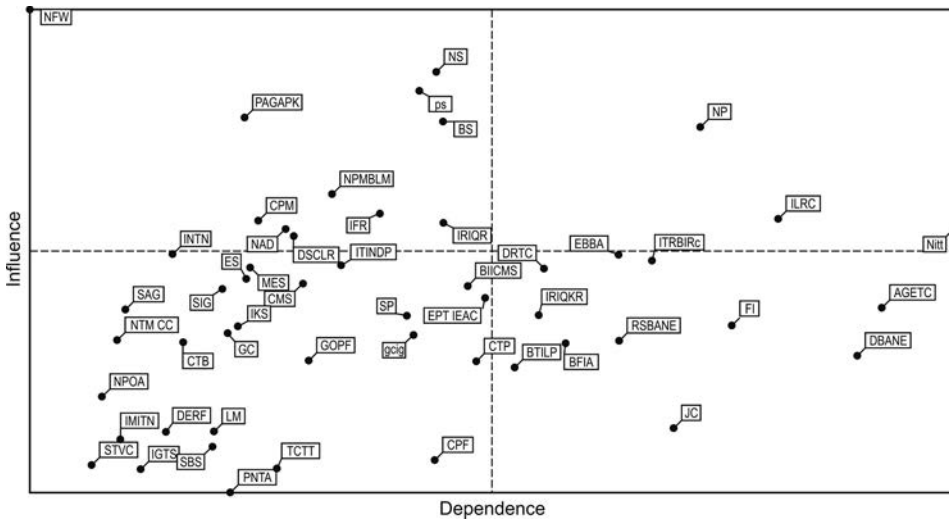


Fig. 3. Direct influence x dependence map
 Source: authors' elaboration

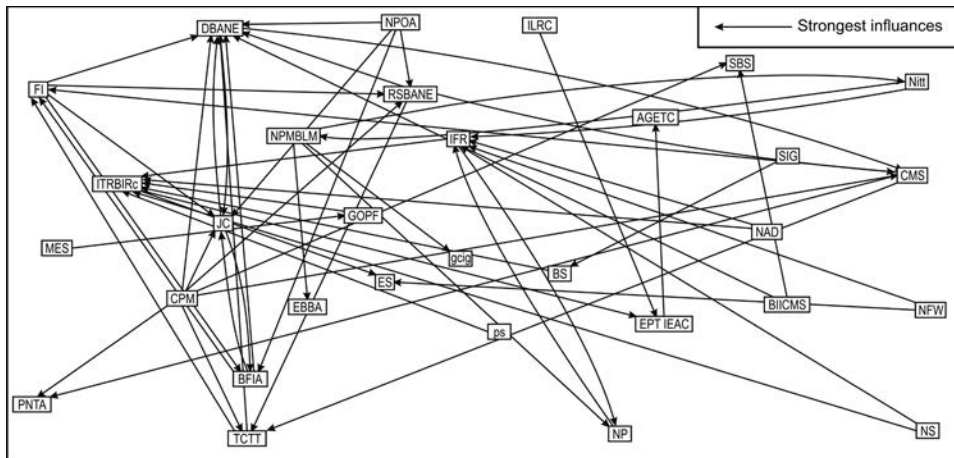


Fig. 4. Direct influence graph
Source: authors' elaboration

6. THE INDIRECT CLASSIFICATION

As noted above, to consider the propagation of loops and feedback among the variables the original matrix should be raised to successive powers. The set of scores in the original matrix was used as the input to the MICMAC software. The matrix, then, was raised to power of 4 and showed satisfying stability in terms of ranking of variables. The summary of variables raking based on the indirect classification is provided in figure 8. New total scores in rows and columns could imply significant change in the pattern of variables' distribution across the influence x dependence plane and influence graph as shown in figures 5–6. The summary of matrix characteristics is provided in table 2.

Table 2. Summary of matrix characteristics for indirect influences and dependences

Indicator	Value
Matrix size	52
Number of iterations	4
Number of zeros	1,570

Indicator	Value
Number of ones	345
Number of twos	376
Number of threes	413
Number of P	0
Total	1,134
Filling rate	41.93787%

Source: authors' elaboration.

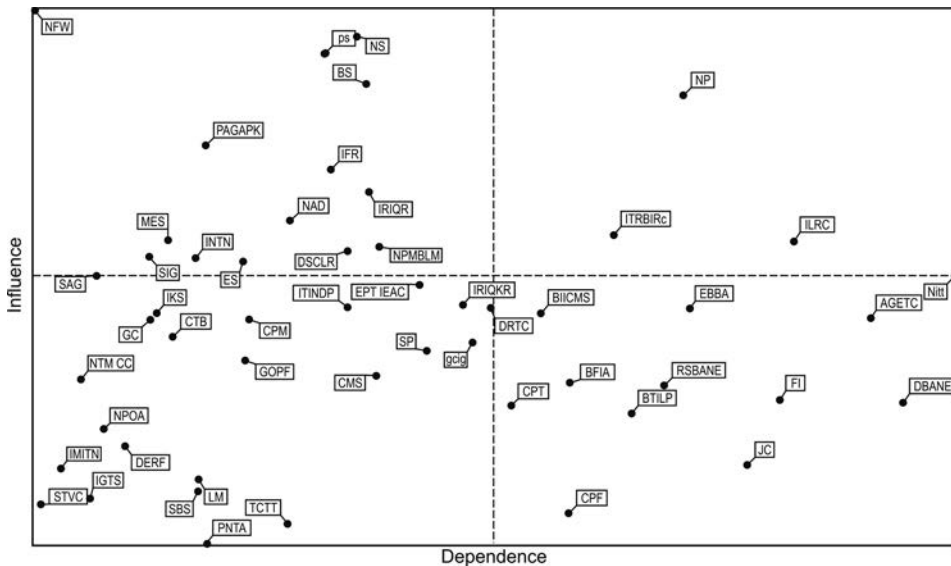


Fig. 5. Indirect influence x dependence map
Source: authors' elaboration

The output of the model for indirect classification points out that influent factors are turned even more influent. The same also applies to the dependent variables now located further away in the lower right part of the plane. This new pattern of points and the associated displacement with indirect classification only make the whole system more stable. Figure 7 shows the displacement map across all variables.

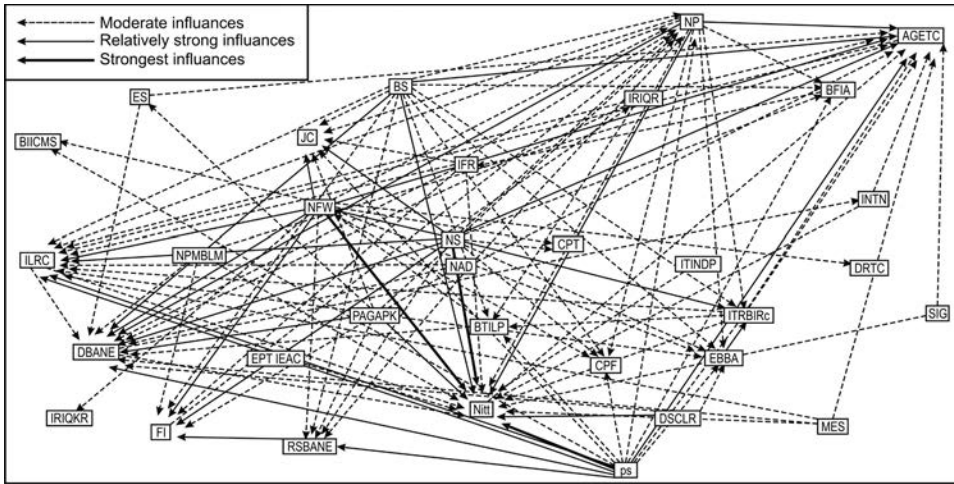


Fig. 6. Indirect influence graph
Source: authors' elaboration

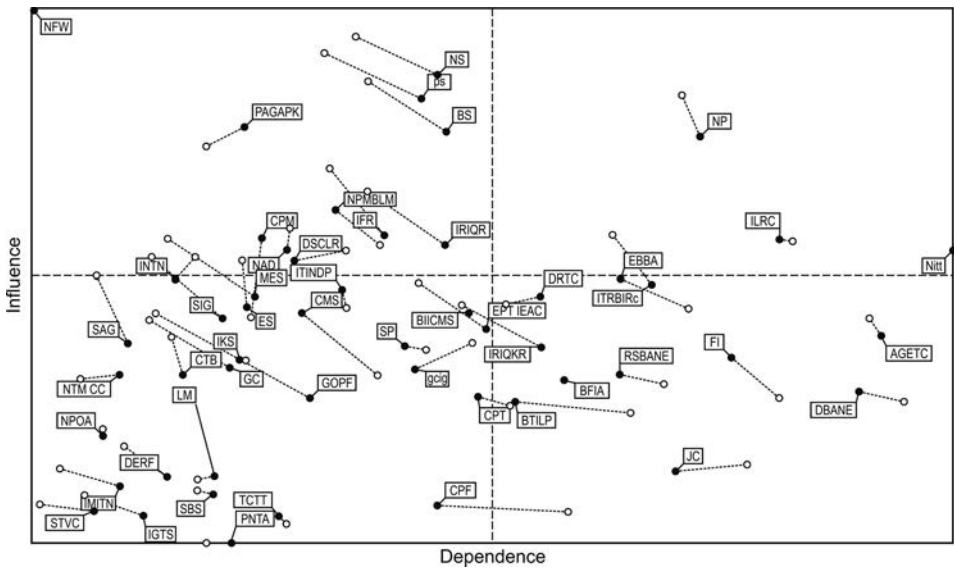


Fig. 7. Displacement map: direct/indirect
Source: authors' elaboration

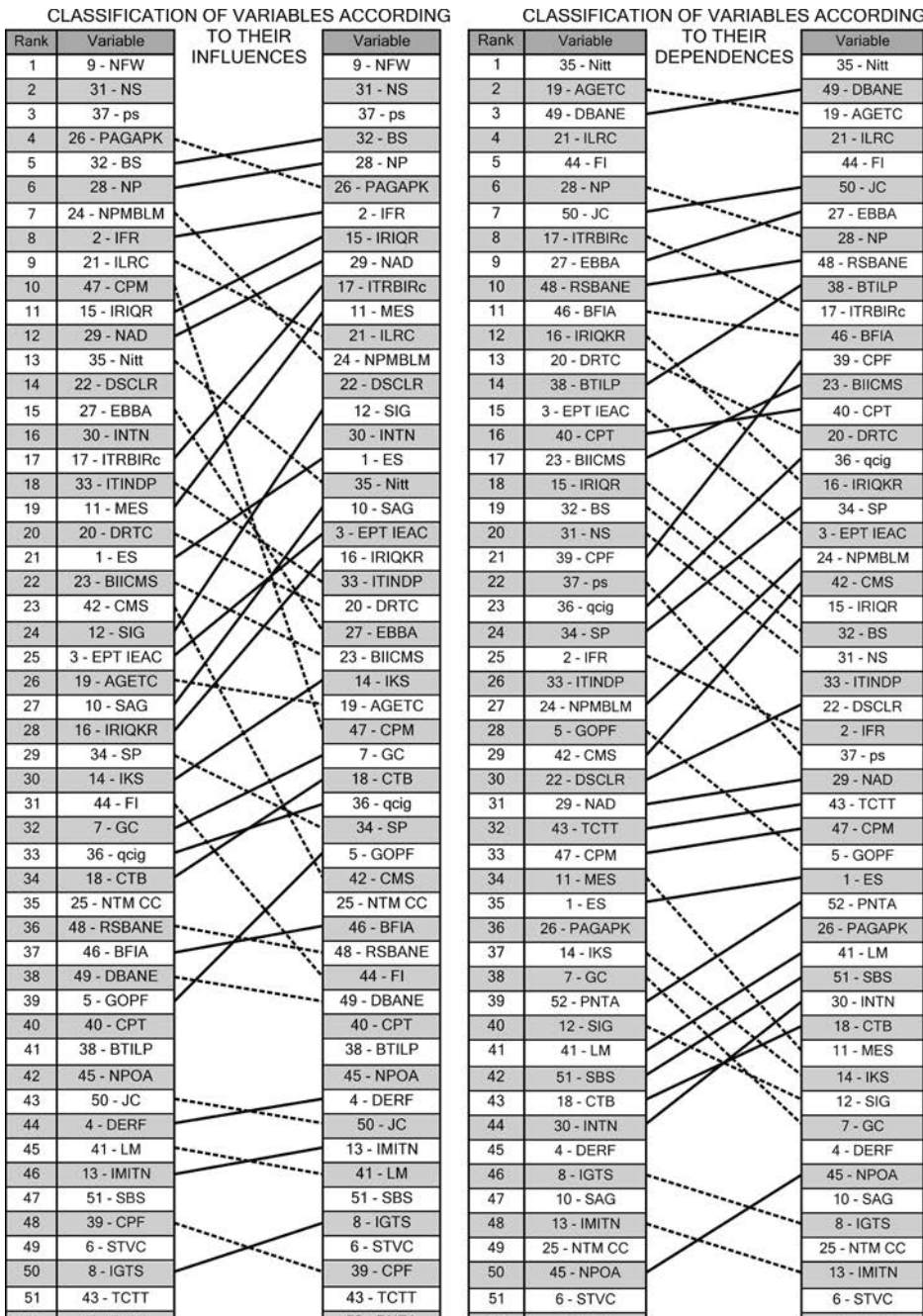


Fig. 8. Comparison of influencing and depending variables ranking based on the direct and indirect classifications

Source: authors' elaboration

7. STABILITY AND INSTABILITY

The general pattern of the positions of the variables on the plane helps us make sense of the general stability of the system. Clearly an *L shaped pattern* demonstrates a system with a number of influent and dependent variables, with few or limited number of excluded and relay variables, and therefore more stable. But a pattern of points in the upper right and lower left parts and around the diagonal only results in more instability of the global dynamics. In the case study of Baneh city the pattern of variables dispersion across the plane almost follows an L shape (see figure 9) and as a result the whole system is rather stable.

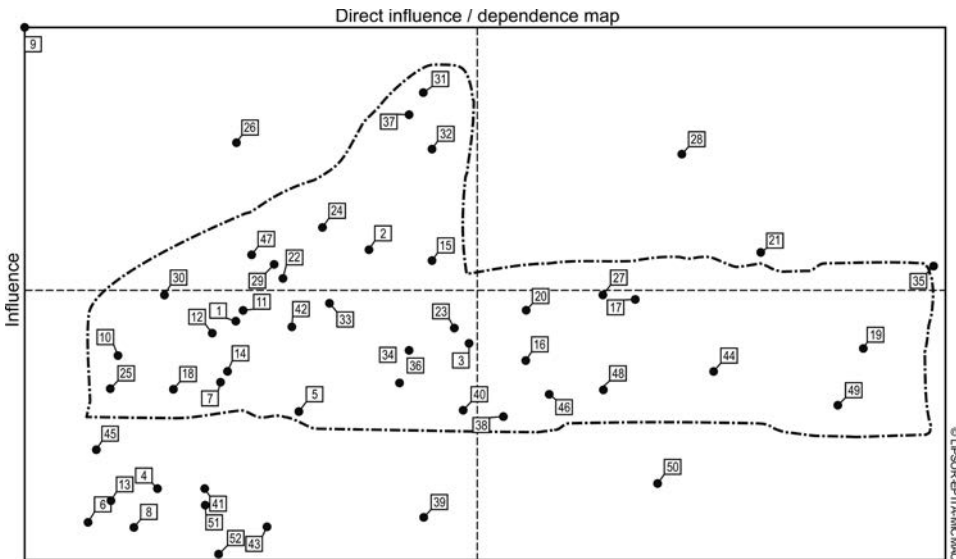


Fig. 9. L shaped pattern of variables dispersion

Source: authors' elaboration

8. KNOWLEDGE LIMITATIONS

Several difficulties hindered the quality of this research. Among them the most important are:

1. Most of experts were not familiar with prospective structural analysis in general and with futures studies/research in particular.
2. Most of experts required significant training on how to work with the MICMAC software.

3. Most of professionals responsible for city affairs were not knowledgeable enough about the whole system development of a city in its wider environment, important processes in the built-environment, and all variables that are affecting a city development.

4. This extended and complex topic of study requires interdisciplinary knowledge and understanding which is quite rare among the city officials and professionals.

Despite these challenges that undermine the credibility of results reported and analyzed here we have to note that *trial and error in applying futures research* methods can educate both experts and laypersons in system dynamics and futures studies in order to engage them in more long-term informed discussions with respect to the alternative futures of the city development.

Like other methods that rely on the opinion and judgment of experts and citizens, the prospective structural analysis of the interrelationships among different variables too faces the challenge of incomplete understanding and perception of experts when dealing with a complex topic. Clearly the knowledge of experts and professionals is reliable and credible to a limited extent. In addition to this problem, the complexity and the interdisciplinary nature of the city development on the one hand, and the relative small size of the city on the other hand significantly reduce the size of pool of experts and qualified researchers. Also, the remarkably low participation rate of online experts in social networks and the constraints to online engagement of citizens in serious minded research efforts could be some worthwhile ideas for further investigations.

Overall our findings suggest that the application of prospective structural analysis is helpful to uncover the dynamics of factors and provide a set of system based insights which could ways to shape the alternative futures of a small yet important city in Iran. In particular, in the absence of reliable quantitative databases of important statistics, a common challenge for researchers in countries like Iran, structural analysis is an important tool to make sense of any environment and to identify factors that could affect the alternative futures of systems. In other words, faced with the challenge of lack of data, incomplete data, and lack of important statistical indexes in order to monitor the trends, the researchers could use structural analysis as a suitable tool to gain some important insights so as to provide a list of recommendations.

9. CONCLUSIONS

Using environmental scanning and trend analysis techniques an inventory of variables was identified. Then 52 variables from different spatial levels (international, regional, national, and local) were selected as the most important

variables for prospective structural analysis. Structural analysis helps explore the structure and dynamics of a system as well as its web of interrelations. The results here show a rather dispersed set of variables across the influence x dependence plane. Based on the visualization it is evident that the number of variables with moderate degrees of influence and dependence is large and thus *the system is stable*.

Structural analysis is a method of futures that sheds light on the global dynamics of systems and help building a web of complex interrelations among diverse variables. Also the stake factors which are those variables that exhibit both high influence and high dependence not only could provide a boomerang effect but also hint to potential breakpoint of the system. These are 1) *national product*; 2) *amount of goods entering the city*; 3) *number of incoming tourists to the city*; 4) *city and provincial transportation*; and 5) *facilitation of investment*. Hence, emphasis on monitoring these variables and directing the managerial effort toward guiding them in the path of desired evolution of the system is highly recommended. The relative shortage of such variables is one of the problems that the Baneh system of urban planning will have to face in the future.

Table 3. List of 52 variables and abbreviations used in the MICMAC software

Economic sanctions	ES
Improvement of foreign relations	IFR
Economic and political ties between Iran and East Asia countries	EPT IEAC
US Dollar exchange rate fluctuations	DERF
Gold and Oil prices fluctuations	GOPF
Satellite TV channels	STVC
Global security	GC
Improvement of global transportation system	IGTS
Natural Future of World	NFW
Stability of Arab governments	SAG
Middle East security	MES
Stability of Iraq government	SIG
Improvement of Iraqi transportation network	IMITN
Iraqi Kurdistan security	IKS

Iran-Iraq relations	IRIQR
Iran-Iraqi Kurdistan relations	IRIQKR
Improvement of trade relations between Iran and region countries	ITRBIRc
Cultural ties between people on borders side	CTB
Amount of goods entering the city	AGETC
Development of regional transportation companies	DRTC
Investment by large regional corporations	ILRC
Development of suitable customs laws and regulations	DSCLR
Building infrastructures and improving customs management system	BIICMS
National planning for management of border local markets	NPMBLM
National TV and media and news coverage of the city	NTM CC
Political approach of government to areas populated by the Kurd ethnic group	PAGAPK
Earmarked budget for border areas	EBBA
National product	NP
National aggregate demand	NAD
Improvement of national transportation network	INTN
National security	NS
Border security	BS
Importance of tourism industry in national development policy	ITINDP
Spatial planning	SP
Number of incoming tourists to the city	Nitt
Quality control of inputs goods	qcig
Political stability	ps
Building tourism infrastructure in local place	BTILP
City perspective and fabric	CPF
City and provincial transportation	CPT
Local media	LM
City management system	CMS

Table 3 (cont.)

People training courses for good treatment of tourists	TCTT
Facilitation of investment	FI
Natural potentials of the area	NPOA
Building factories and industries in the area	BFIA
City and provincial management	CPM
Relative situation of Baneh city	RSBANE
Development of Baneh	DBANE
Job creation	JC
Supervising the budget spending	SBS
Promotion of natural tourist attractions	PNTA

Source: authors' elaboration.

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BOOK REVIEWS

Mark BOYLE, *Metropolitan Anxieties: On the Meaning of the Catholic Adventure in Scotland*, Ashgate, Farnham 2011, 292 pp.

Academic and populist debate over religion, nation and ‘sectarianism’ in Scotland has clouded the changing experiences of what is sometimes called ‘the Irish Catholic community’ as well as ‘the Protestant Unionist heritage’. Mark Boyle’s (2011) multi-layered oral history of ‘the Irish Catholic community’ challenges this from the perspective of postcolonial theory. As he notes, one side in the dispute denies that sectarianism exists from the privileged ‘metrocentric’ perspective of professional social science while the other, more critical, side maintains that Scottish society is uniformly guilty of ‘institutional sectarianism’. Both sides share the same ‘metrocentric’ assumption that they have access to superior social scientific knowledge that can establish ‘the truth’ or otherwise of sectarianism.

Instead Boyle’s post-colonial framework rejects any claim that attempts to provide definitive knowledge that would make fully intelligible the Irish Catholic community in Scotland. Here group experience can only be known through idiographic, particular forms of knowledge rather than generalised categories. Boyle draws on Jean-Paul Sartre’s collective concepts of ‘masses’, ‘spontaneity’ and ‘Party’ (or ‘tribe’ as Boyle prefers). In the case of Irish Catholics as a group in Scotland alterity has been shaped by the proximity of the British empire, migration and co-existence in the colonial metropolis, anti-Irish racism, and political violence in north-east Ireland from the late 1960s to 2000s.

In challenging metrocentric assumptions that discount Irish Catholic heritage in Scotland Boyle also recognizes some of the problems of that assuming there is an identifiable and stable ‘community’ of Irish Catholic heritage. He argues that the category ‘Irish Catholic’ cannot be taken to refer literally to an actually-existing empirical population, say Irish-born or Irish heritage: ‘It is not a category with an essential referent or clearly defined object but instead a ‘hyper-real’ construct; a flag around which people gravitate, albeit to different degrees’ (p. 17).

However, throughout Boyle refers to ‘the Irish Catholic community in Scotland’ and ‘the Irish Catholic experience’ as a shared collectivity formed by ‘a unique cultural location [of] former colons now resident in the metropolitan heartland of former coloniser’ (p. 62). Knowledge of the historical processes of immigration and colonialization

are in this way made dependent on a binary and essentialist post-colonial model of an 'indigenous community' and a 'diasporic community' who continually encounter each other in multiple and complex forms. The Irish Catholic experience is therefore uniquely situated in every individual case.

In contrast to the 'inert tribalism' of frozen collective identities, Boyle argues that the Irish Catholic community in Scotland has exercised multiple forms of group belonging and difference, what he calls 'progressive tribalism'. This is founded on a more or less stable set of cultural signifiers: 'there exists a steady state or equilibrium to which the Irish Catholic community has repeatedly returned no matter what social, political, cultural, and economic offshoots it has spawned' (p. 260). While cultural alterity can be experienced negatively with the denigration of Irish Catholicism in metropolitan Scotland, the cultural proximity of a shared everyday universe constantly erodes any fixed culture of grievance.

With 'progressive tribalism' universal processes and individual lives are kept in 'constant suspension'. In this fluid situation it is difficult to establish a 'primary sense of loyalty'. After all, 'few members of the Irish community in Scotland deployed the category "Irish Catholic in Scotland"' (p. 97). Hence the group name under which Boyle constructs as 'progressive tribalism' is not one recognized by the subjects that it is meant to apply to. Here the social scientist defines reality for his subject despite cautioning against metrocentric classification systems.

Boyle constructs six ideal-types of hybrid Scottish-Irish Catholic identities ranging from the least assimilated 'biological Irish' to most assimilated 'Scottish with a repressed Irish Catholic past' (pp. 112–113). This is laced through with cultural constructions of Ireland as a lost homeland, ranging from the bitter and melancholic memories of first and second generation immigrants to the enchanted landscapes imagined by later generations, to more recent processes of modernization of (pre-crisis) Irish society and economy. It has also been buttressed by the role of Irish Catholic descendents in political and economic struggles for social justice through the labour movement, values that are served equally as well today by Scottish nationalism as it was in the past by British labourism. Clearly, Catholics in Scotland have not all been committed to progressive, left-wing or anti-imperialist politics. For instance, just as Scottish Catholics fought against fascism during the Spanish civil war (1936–1939), on the home front other Scottish Catholics supported Franco's forces as defenders of the church against communist atheism (Gray, 2008, pp. 125–134).

By 'Irish Catholic heritage' Boyle identifies a continuous collective subjecthood formed out of an unbroken cultural or religious tradition by the descendants of Irish immigrants in modern Scotland. On the other hand, in important ways the 'Irish Catholic community' in Scotland is defined and made intelligible by the discourse of sectarianism itself. Boyle's detailed research by-passes arid debates about sectarianism as a system or a cultural 'distortion', whatever the merits or de-merits of the Sartrean and post-colonial theory that he mobilizes to make the Irish Catholic experience intelligible in the first place. Boyle's study marks a refreshing and important alternative to the empiricism and mythologising that currently frames both scholarship and government policy on so-called religious sectarianism and cultural heritage in Scotland.

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Judith MIGGELBRINK, Joachim Otto HABECK, Nuccio MAZZULLO and Peter KOCH (eds.), *Nomadic and Indigenous Spaces. Productions and Cognitions*, Ashgate, Surrey 2013, 298 pp.

The book titled *Nomadic and Indigenous Spaces. Productions and Cognitions* edited by Judith Miggelbrink, Joachim Otto Habeck, Nuccio Mazzullo and Peter Koch is a collection of essays which represent anthropological, geographical and ethnological approaches. The book is a result of the conference which took place at University of Leipzig in February 2011.

The first part called 'Nomadic and Indigenous Spaces: Paths and Perspectives', authored by Judith Miggelbrink, Joachim Otto Habeck, Nuccio Mazzullo and Peter Koch, is an introduction to different aspects of unexplored space and nomadic approaches to spatiality.

The second chapter, 'A Place Off the Map: the Case for a Non-Map-based Place Title' written by Denis Wood, presents the idea of the places which exist with their location and places which have no location but are very important for example for herders or Gypsies.

The third chapter, 'From Nomadic to Mobile Space: a Theoretical Experiment (1976–2012)' by Denis Retaillé, refers to the discussion about the end of nomadism in the Sahel. The author tries to show a new theoretical approach to space and places.

The chapter called 'Where is Indigenous? Legal Productions of Indigenous Space in the Russian North', written by Gail Fondahl, contains the new spatial visualizations across the legal landscape of Russian North. The author presents also legislation aspects of producing space.

The next chapter called 'The Nellim Forest Conflict in Finnish Lapland: Between State Forest Mapping and Local Forest Living', written by Nuccio Mazzullo, reflects on many aspects of the conflicts arising from large-scale forestry in the reindeer herding area. The author shows the case study of Nellim in Finnish Lapland as an example of conflict connected with the access to resources by the state-run forestry authorities and reindeer herders.

The part called 'Sámi-State Relations and its Impact on Reindeer Herding across the Norwegian-Swedish Border' written by Peter Koch tries to explain the theory of power mechanisms. The author seeks the answers to the question why cross-border reindeer herding on Norwegian-Swedish border still exists.

The next chapter called 'Identity Categories and the Relationship between Cognition and the Production of Subjectivities', written by Brian Donahoe, contains a collection of the author's considerations on different categories, classification and subjectivities in anthropology. The author also included some reflections connected with the issue of methodology and language in a discipline.

The chapter called 'Learning to Be Seated: Sedentarization in the Soviet Far North as a Spatial and Cognitive Enclosure' written by Joahim Otto Habeck tries to show how the sedentarization of nomads worked in the 1940s and 1950s in the Soviet Union in practice. The author describes the situation of Siberian reindeer nomads which were affected by administrative restructuring, collectivization or developing of new industrial branches.

The next part called 'Shamanist Topography and Administrative Territories in Cisbaikalia, Southern Siberia' written by Joseph J. Long is an attempt to show some aspects of ritual practices of Buryat Mongols. The author tries to describe sacred places along the road, annual offerings or sacred mountains in the context of shamanist topography, which enables the following of migration routes of their ancestors.

The part called 'From Invisible Float to the Eye for a Snowstorm: The Introduction of GPS by Nenets Reindeer Herders of Western Siberia and Its Impact on Their Spatial Cognition and Navigation Methods' written by Kirill V. Istomin is a proposal of a new approach to analysing the adoption process of technical innovation in specific cultures. It can explain why some innovations have greater effect on societies than others. The author presents also three-phase model of adopting a technological innovation.

The chapter called 'Narratives of Adaptation and Innovation: Ways of Being Mobile and Mobile Technologies among Reindeer Nomads in the Russian Arctic', written by Florian Stammler, shows how Nenets nomads participate in technological changes. The author tries to present how new technologies can change people's way of perceiving their surroundings.

The chapter called 'From Inuit Wayfinding to the Google World: Living within an Ecology of Technologies' written by Claudio Aporta presents a reflection on using maps and global positioning system (GPS). It also shows the author's observations of Inuit huters' everyday life in the context of using not only traditional methods but also new technologies. The author draws particular attention to how new navigational and cartographic technologies are embedded in the world of technologies.

The last chapter called 'Epilogue' written by Tim Ingold is some kind of summarization of the whole book. The author tries to point out the most important ideas from the whole collection of the papers.

The strong point of the book *Nomadic and Indigenous Spaces. Productions and Cognitions* is that the authors of the essays address rarely discussed topics. The essays also present an interesting overview of using new technologies in some regions.

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**Linda STEG, Agnes E. van den BERG and Judith I. M. de GROOT,
Environmental Psychology: An Introduction, Wiley-Blackwell, 406 pp.**

Environmental Psychology: An Introduction is a wonderfully interesting, research-based analysis of the psychological interplay between people and their built and natural environments. It incorporates the work of over fifty well-known scholars offering an international approach and providing a valuable source of knowledge of key issues in the environmental psychology.

The book consists of three parts (with a total number of 28 chapters) and offers a valuable study of the intriguing correlation between the environment and human behaviour. Each chapter starts with a useful introduction providing the necessary outline of the subject and ends with a glossary, suggestions for further reading and review questions.

The book opens with an introductory chapter providing a short outline of history and main research methods used in the environmental psychology. The reader is informed about the beginnings of environmental psychology and its 'founding fathers' Egon Brunswik (1903–1955) and Kurt Lewin (1890–1947), who argued that the 'physical environment can affect psychological processes subconsciously'. The reader moreover learns about the increase in popularity of systematic research concerning environmental psychology that started in the late 1940s, which is when 'human behaviour interactions slowly received more and more recognition as a full discipline'.

The first part of the book encompasses eleven chapters tackling issues like: environmental risk perception, environmental stress, residential satisfaction and place attachment, as well as scenic beauty and the link between environment and quality of life. There we learn about the connection between environmental risk, values and morality and also about how our emotions may influence our risk perception.

The second part of the book deals with factors influencing environmental behaviour and focuses more on the social facet of the environmental psychology. The author investigates the phenomenon of pro-environmental behaviour (further differentiated as goal-oriented or not) and probes the correlation between social value orientations and approach to the environment. Here we learn that there are four motivational types (power, universalism, benevolence and tradition) that may mould people's behaviour and consequently shape their attitude to the environment. It is also noteworthy that the closing chapter in part two of the book provides an interesting analysis of the situation in Latin America. As the author notices herself: 'this chapter is different from the rest of the book'. It gives a very interesting Latin American background and includes an overview of topics studied in Environmental Psychology in Latin America.

The third part of the book encompasses eight chapters dealing with encouragement of pro-environmental behaviour. It explains the notion of 'persuasive psychology' and shows ways of stimulating social environmental systems. In the last chapter the author concludes that there is a strong need for further integration of different subdomains of the environmental psychology and a lot of areas to be covered by the research agenda in the nearest future.

The book is an interesting read. Not only is it a valuable source of information for students (providing them with clear definitions, useful figures, tables and graphs) but also a well-rounded and comprehensive study of the increasingly important issue which is the link between the environment and people's lives.

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Paul KNOX (ed.), *Atlas of Cities*, Princeton University Press, Princeton and Oxford 2014, 256 pp.

Atlas of Cities is a book full of surprises. It escapes an easy categorization as it not only takes the form of an atlas, but also a textbook on urban planning, history, sociology and geography, a guide on the most distinctive cities, and an absorbing storytelling. The book leads the reader through the complicated albeit exciting urban world, gradually unveiling the role of a wide range of factors that determined the location of cities, affected their functional structure and built environment, and steered their evolution. One may find here a considerable load of information referring explicitly to the cities, as well as to processes and phenomena occurring within their direct surroundings and in wider spatial contexts. Exemplification of specific cases is very suggestive due to a spectrum of eye-catching graphics.

The content of the book is divided according to the categories of cities, however, this classification differs slightly from commonly used ones. Subsequent parts of the atlas reflect the passage of time, but they also concern various city forming factors and types of responses of urban structures to their occurrence. This happens through deeper exploration of chosen examples – so called core cities (Athens and Rome, Augsburg, London, Venice, Florence, Innsbruck, Lübeck, Bruges, Paris, Ghent, Istanbul, Manchester, New York, Los Angeles, Mumbai, Brasilia, Miami, Milan and Freiburg) and a few supplementary cases in each chapter. Some of those examples may seem out of context at first glance, but all together they contribute to the emergence of a complex and adequate diagnosis of the contemporary urban world, of course as far as the limited capacity of such format allows for.

The first chapter – ‘The Foundational City’ presents the beginnings of urban Europe. In reference to Greek and Roman cities, ancient civilizations’ achievements are presented, starting from the evolution of political doctrines, architecture, town planning, and the development of infrastructure, ending with the remarks on globalization processes of those times. The authors do not cling, however, to ancient era exclusively - they also make references to contemporary problems in the Mediterranean region, such as urban decline.

In the following part of the book, the problem of medieval urban networking is explored. One may find here information on the European commercial revolution of the

13th century, merchant nations which are exemplified by the German *Hanse*, or the internal structure of trade centres. What is particularly interesting in this chapter are some facts on medieval transport and communication, e.g. postal speeds or journeymen mobility.

The subject of globalization is once again referred to in the chapter on imperial cities. Byzantium, and afterwards Constantinople and Istanbul, exemplifies the role of strategic location and efforts made to secure it, as well as the unique spatial planning solutions and architectural splendor. This is followed by description of the contemporary efforts aimed at regaining the status of global city. Among those, the realization of mega-transportation projects is explored, since it has accidentally contributed to the discovery of great treasures of cultural legacy.

As it might be presumed, the next chapter tackles industrialization. Here many relevant information about 18th and 19th-century technological and transport innovations, industrial architecture and later industrial decline are included. However, the most absorbing parts refer to the impact that industry had on peoples' lives (working and living conditions, struggle for social reforms, progressing polarization of wealth and poverty, etc.), adequately illustrated with maps and suggestive graphs.

In the following chapter, 'The Rational City', the evolution of planning thought in Paris is examined in detail. The analysis reveals subsequent layers of built development which reflected the changing attitude towards 'social engineering' since the Roman times, especially in the 19th century. Much attention is paid to the improvement of urban dwellers' quality of life due to the advancement in sanitary infrastructure as well as the development of culture and recreational areas.

The next part of the book again refers to globalization, but in contrast to the previous chapters, only to its nowadays observed form. The emphasis is put on global infrastructural networks and entrepreneurship linkages, migrations and social inequality, forms of regional and local economic activity, as well as on tourism. Apart from that, the authors referred to global cities' skylines – assessing their visual impact and unveiling their relation to urban land rent.

Compared to a rather unsurprising chapter about global cities, the next one – 'The Celebrity City', may be found very interesting. It contributes to a deeper understanding of the social, economic and spatial impact of celebrity phenomena that many people are generally familiar with because of mass media. This chapter has a very 'fresh' approach, which makes it so engaging. However, it was largely based on methodology that on the one hand is innovative, but on the other – a little controversial.

The following two chapters – 'The Megacity' and 'The Instant City', allow the reader to finally leave Europe and Northern America in order to learn more about Indian, Chinese and Brazilian cities. Mumbai, supported with some cases from east China, is cited to explain the complexity of urban growth and the challenges its rapidity brings. This is followed by the case of Brasilia, which illustrates the unpredictable results of confronting utopian ideas with the reality.

The next chapter, 'The Transnational City', again tackles international relations, but this time the forms and the outcome of mixing different people and their cultures are

emphasized. Miami serves here as an example of an urban ‘router’ and a magnet, helping to understand what corporate linkages may mean and how illegal activities may be related to other economic sectors. Another issue addressed is spatial segregation of migrants and their influence on urban iconography. The following, quite startling part of this chapter, raises the problem of death in transnational cities and the complications it causes.

The last three parts of the book take the reader to Europe again, where the role and the impact of creativity are examined, implementation cases of sustainable development ideas are presented, and the possibilities for smart urban development are discussed. All those chapters illustrate the recent acceleration in pursuit of a better tomorrow.

Although *Atlas of Cities* offers the reader much more than an ordinary collection of cartographic images, there is no doubt they are its essence and deserve a wider comment. Maps, together with plenty of other colorful images, make the content of the book more approachable and easier to remember. The graphic design and the overall publishing quality of the atlas are certainly worth appreciating, starting from the front cover till the last printed page. A few images require more detailed keys or the correction of town names (e.g. pp. 58, 59, 225), however, this is just a slight deficiency that does not depreciate the excellent quality of the whole work.

Atlas of Cities is certainly worth recommendation – it is stimulating and inspiring. Its content is very complex, however, some more information from outside Europe and the USA would be very welcome. Anyway, those who do not know much about urban geography and planning should be pleased with its simplicity, clarity and approachability. On the other hand, among its target readers might be people who scientifically or professionally deal with urban issues, as well as students of various academic fields (urban planning, geography, urban sociology etc.) and those at lower levels of education. In hands of a creative teacher, such a book might also become a useful supplementing tool for geography and history courses. Apart from that, “Atlas of Cities” ought to be interesting to all others who want to find out more about the underpinning values that affected cities in the past and determine their shape and performance nowadays. This publication certainly deserves landing up on a home bookshelf – it is the type of reading that no one will be bored with.

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Till DUPPE and E. Roy WEINTRAUB, *Finding Equilibrium*, Princeton University Press, Princeton and Oxford 2014, 276 pp.

Finding Equilibrium by Till Duppe and E. Roy Weintraub is a masterpiece story that revolves around one of the most important discoveries in economics – general equilibrium theory, which states that under certain conditions, there is a set of prices which result in

the aggregate supply equalling the aggregate demand. The book covers various aspects associated with this model starting from the general outline of the theory, the background of the scientists responsible for delivering the proof of its existence as well as the sociological aspects and factors that are instrumental when it comes to crediting scientists.

The book reveals the backstage of the life stories of three outstanding scientists – Kenneth Arrow, Debreu and Lionel McKenzie against the background of economics in the second half of 20th century.

It offers a unique view on general equilibrium theory, focusing not on the proof itself, but rather on all factors that were present in the post-war economic reality. The authors combined in an interesting way the scientific material and biographies of remarkable economists as well as enabled a deep insight into history. The book illustrates a passionate race between the Arrow-Debreu team and McKenzie working separately to claim credit for delivering the proof of one of crucial modern economic concepts.

The book uncovers the enormous role of talented men who revolutionized economics in the 1950s and 1960s and increased the importance of economics as an independent field of science, which in 1969 was finally added to the list of categories in which the Nobel Prize is awarded.

The book is well structured, divided into three parts and eight chapters.

It starts from the biographies of Arrow, Debreu and McKenzie. This part provides an overture for the remaining chapters as it reveals the background and conditions that shaped the characters of the protagonists. All three life stories indicate that the heroes struggled through serious difficulties and their success was the result of extremely hard work and remarkable talents.

First, the reader encounters Arrow, who has Romanian Jewish origins. Despite his extraordinary aptitude, maturity and hard work he was unable to enroll at Columbia University due to lack of funding. However his ambition and discipline led him to the top league of economists, which was finally reflected in granting him the Nobel Prize in 1973.

Even more serious difficulties affected another scientist, Debreu, a Frenchman who was orphaned as a young child. However, his superior capabilities, modesty and desire to broaden his knowledge led him to success and in the end he also became a Nobel Prize Winner.

The third protagonist, Lionel McKenzie, experienced a tortuous and bumpy path in his scientific career. Despite all efforts, he was not able to achieve such personal success as Debreu and Arrow who worked in highly prestigious universities. McKenzie, in contrast, was rather anonymous working in second tier universities and not perceived as a high-flyer. And even though he demonstrated the existence of proof for general equilibrium simultaneously with his better known colleagues, he was never granted the Nobel Prize.

The second part of the book portrays the reality in which Arrow, Debreu and McKenzie worked in the post-war period, as well as introduces us to key economic organizations, such as the Cowles Commission, which had an impact on the direction in which economics developed. In this part of the book the authors also give an account of a conference on activity analysis held in June 1949, one of the most important economic events in the

decade. We can conclude that this conference provoked and accelerated efforts which in the following years led, among others, to finding the proof for equilibrium theory.

The third part reports step by step the process of creating papers on an existence of the proof by Arrow-Debreu and independently by McKenzie. Also, in this part of the book the authors examine the years following the publication demonstrating the existence of the proof and the competition between different mathematical and economic communities that were formed according to views represented by each of the three scientists.

The last part contains a sociological conclusion and invokes the Matthew effect, where 'eminent scientists will often get more credit than a comparatively unknown researcher, even if their work is similar'. Both Arrow-Debreu and McKenzie demonstrated the existence of the proof of general equilibrium using similar techniques that led to the same conclusion. However, only Debreu and Arrow were credited and became Nobel Prize laureates, when at the same time McKenzie was overlooked. The main reasons seem to be McKenzie's lower recognition and his lack of membership in the most influential communities of the time which determined the views and direction of development of economics. In contrast, Debreu and Arrow were members of such communities. Thus, the book reveals a social factor independent from factual knowledge that led to the underestimation of McKenzie's achievements.

It is worth noting that in the post-war economy there was a rapid shift from small family businesses towards large corporations, which entirely changed the economy and way of living. It might have resulted in greater interest in macroeconomics and general equilibrium theory itself.

Written in an intelligible way, the book is great reading for scientists, economists, students and all people interested in history of economy. Duppe and Weintraub wrote the book in a very stylish way, depicting the backgrounds of the remarkable protagonists, the atmosphere prevailing among prominent scientists associated with economics as well as organizations determining the direction of the development of economics.

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