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DOES GEOGRAPHICAL LOCATION MATTER? ASSESSING SPATIAL PATTERNS IN PERCEIVED QUALITY OF LIFE IN EUROPEAN CITIES

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Abstract

The Quality of Urban Life is one of the most important issues of the present policies, being highly researched. The spatial dimension of this concept is still a major challenge for both researchers and policy makers as it was not enough explored and applied. Therefore, the present paper aims to create a more in-depth image on the Quality of Urban Life in Europe, by detecting and explaining the spatial differences in relation to their territorial context. Spatial statistics applied on Urban Audit Data is employed to create a typology of European cities, to identify spatial outliers by using spatial autocorrelation and to map the regional differences in the relationship between different domains of the Quality of Urban Life. Our results bring to light both some clear regional patterns in perception on the Quality of Urban Life and some particular cases - outliers – which require special attention when developing different planning policies. The present research identifies a dominant West-East and North-South gradient, strengthening the idea that QoUL- which has a wide spatial variation- is highly influenced by the geographical location. Hence, the study not only creates a general in depth diagnosis on the Quality of Urban Life in Europe, but also proposes a methodological framework for researching perceptions from a spatial point of view.

Keywords: *urban quality of life, subjective indicators, Urban Audit, spatial statistics, regional patterns*

1. INTRODUCTION

The scientific research which focuses on Quality of Urban Life (QoUL) has gained a widespread attention during the last 50 years. As quality of life is a multi-faced construct (Yuan, Yuen, and

Low 1999) objective and subjective as well as integrated approaches (McCrea, Shyy, and Stimson 2006) have tackled the concept of QoUL from multiple perspectives and at different scales, showing the importance of the results both for scholars and policy makers. While objective measurements are preferred due to availability of different statistic data and the ease of comparing different components of quality of life at different scales during distinct time periods (Sajeva, Rybakovas, and Liugailaitė-Radzvickiene 2013), subjective approaches have the ability to investigate quality of life through perceptions and evaluation of people's lives (McCrea et al. 2011).

A lot of research has been made for analyzing QoUL at city level (Lee 2008); from the regional policy makers' point of view, studies which compare multiple cities are needed (Morais, Miguéis, and Camanho 2013) in order to identify areas with a high need of policy intervention and to determine the diversity of urban development (Nina Schwarz 2010). At continental scale, several studies have been made for investigating QoUL, for instance in American cities (Andrews and Withey 1976; Schneider 1975), and also in Latin American ones (Santiso et al. 2008). As for Europe, improving quality of life has become a priority during the last decade as four out of five European citizens are living in urban areas ("Urbanisation and Land Abandonment — Rewilding Europe" 2015). It is one of the priorities of the renewed Lisbon Strategy and also of the Community Strategic Guidelines on Cohesion for 2007–2013 to improve the attractiveness of regions and cities. A good quality of life is crucial for attracting and retaining a skilled labour force, businesses, students, tourists and most of all residents in a city. Assessing the current economic and social situation is a prerequisite for any improvement, development and future monitoring. Urban Audit offers data collections of urban statistics and provides information on the different aspects of the quality of life in Europe's cities, becoming a very rich source of comparable data (Feldmann 2008), highlighting the strengths of some cities and the difficulties encountered by others. There still are wide gaps between cities and even countries on how their inhabitants perceive the quality of life in certain areas. Although the results emphasize large disparities between regions of Europe, and offer valuable information a more in-depth analysis using spatial statistics can reveal a different perspective at regional scale for QoUL (Stiglitz et al. 2010).

Therefore, the aim of this paper is to provide an overview of the perceived quality of life of European cities from a spatial perspective using the results of the 2013 Urban Audit Perception Survey applied in 79 European cities, thus highlighting patterns and similarities between cities. This spatial statistic approach is very important as it emphasizes the characteristics of QoUL in the context of cities vicinity by smoothing both ranking and comparing (individual comparisons) approaches.

The study envisaged three main objectives that follow the framework of this paper: (1) creating a typology of the cities as to explore the spatial distribution of QoUL, (2) highlighting positive and negative outliers on different domains of QoUL in relation to their geographic location, and (3) identifying the spatial patterns of the relationship between perception on different domains of QoUL and general satisfaction of population.

2. BACKGROUND

The share of population living in urbanized areas as well as the average size of urban areas have known considerable growth in the last decades (Caragliu, Del Bo, and Nijkamp 2011). The consequences for the European cities are visible in facing the challenge of combining competitiveness and sustainable urban development which have an impact on issues of QuUL, changing the city's profile in its composition of factors and characteristics (Giffinger et al. 2007). On the same time the increasing interest of researchers in studying the quality of urban life is linked to policy implications (Lambiri, Biagi, and Royuela 2007) and to location decision for households and business (Rogerson 1999). Therefore, questioning and researching the concept of QoUL have larger implications.

In order to take into account all the dimensions of QoUL, researchers follow both objective and subjective measures, as well as integrative analyses (Türksever and Atalik 2001). The objective approaches are using different primary and secondary data which are grouped in different domains; amenities, demography, economic and distance are the most used (Partridge et al. 2008), depending on the profile of the study. While the used variables differ a lot from a study to another, the employed methodologies are mainly based on multivariate statistical techniques (Hair et al. 2006; Sufian 1993; Ülengin, Ülengin, and Güvenç 2001; Das 2008); the final results are usually based on rankings of the analyzed areas and highlight the contribution of different factors to quality of life production (Marshall, Shortle, and others 2005).

However, objective indicators do not provide sufficient information and are not enough to understand how people live and feel about their life quality (Veenhoven 2002). Nevertheless, the vast majority of studies are based on objective approaches, as the subjective ones are using social survey methods, which are appropriate for a local territorial context but have fewer applications at larger extents.

Subjective approaches are specifically designed to collect primary data at the disaggregate or individual level using social survey methods where the focus is on peoples' behaviors and assessments (Marans and Stimson 2011) as each entity has a subjective dimension that is perceived (Diener et al. 1999). Moreover, Campbell et al. (1976) demonstrates that the subjective experiences of people are different from the objective environment, a low correlation between these two approaches being found (Norbert Schwarz and Strack 1999).

Subjective measures, may follow specific spatial patterns, which can be highlighted by using spatial analysis methods, including spatial statistics (Simpson 1989). The increase of the use of GIS technology in social research (as well as QoUL) have opened new methods of integrating subjective approaches in a spatial urban environment (Keul and Prinz 2011; Mridha and Moore 2011; Oktay and Rustemli 2011), offering the possibility to explore the relations between location and responses to surveys. Several authors attempted to identify spatial patterns of different perceptions. (Çarkoğlu and Hinich 2006) use spatial analysis in studying election behaviour, by mapping the party preferences in Turkey. Brody, Peck Mitchell, and Highfield (2004) calculate different spatial statistics for the perception on air quality in Texas, by using spatial autocorrelation for identifying clusters of perception and OLS for assessing the correlation between objectively measured data on the air pollution and people perception. (Conley, Stein, and Davis 2014) use spatial distribution of the perception on physical disorder to identify the perfect size of a neighbourhood.

Shen and Guo (2014) develop an urban sustainability index, including the quality of life as a major dimension; although their index is based on objective measures, they use a survey to give weights to their objective variables. They subsequently use local and global spatial autocorrelation indexes to measure the spatial distribution of the urban sustainability.

Although there are only few attempts in mapping perception on the quality of life, we consider that spatial statistics is appropriate for better understanding the spatial differences among European cities. These methods can be a solution to some disadvantages related to simply ranking European cities according to their perception score on the quality of life: neglect of the inter-relations in regional development and incomplete long term development strategies, stereotypes proliferation, aggressive results that may determine local authorities to ignore them (Schönert 2003).

3. DATA, METHODS AND ANALYSIS

The methodological framework is based on spatial statistics and includes both data collection and GIS analyses, aiming to support the objectives of the study.

3.1 Data collection for European Cities

Even though the European cities have a very diverse history of urban development, their spatial development have received much attention, being recognized as key players in effective land use and development (Nina Schwarz 2010). Several studies (Giannias 1998; Nina Schwarz 2010; Moro et al. 2008) have compared and created typologies based on diverse objective indicators. A research gap in this respect is represented by the use of spatial statistics in subjective approaches, mainly if the availability of data is not a problem.

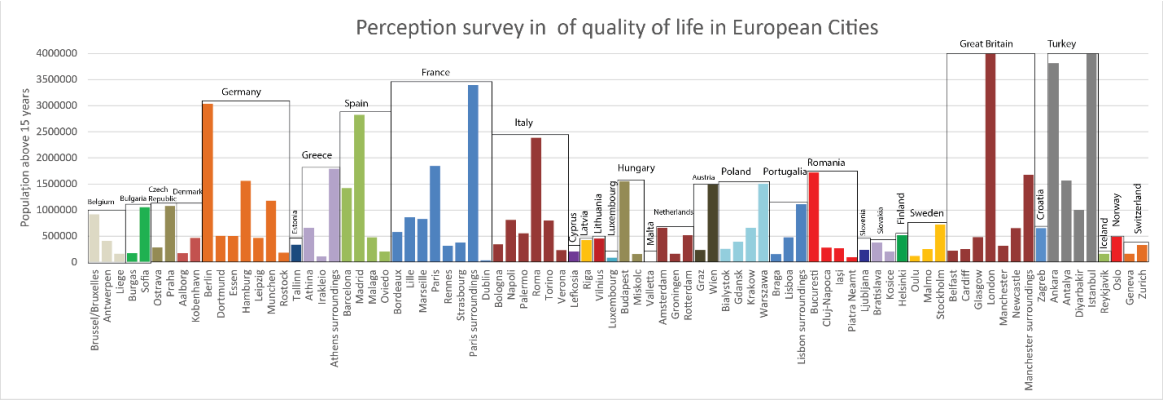

Figure 1 Participant cities at the Perception Survey

At European level, the availability of data is not an obstacle for evaluating quality of urban life. Urban Audit, with more than 336 sub-indicators and 25 indicators grouped in nine categories provides objective and extensive information on the state of urban regions in the EU and their quality of life (Wojtarowicz 2013). The outputs resulted from this extensive availability of data are based on diverse dimensions of QoUL that are chosen by researchers. Besides

providing comprehensive objective data in order to characterize European cities, four surveys were undertaken since 2003 (2003, 2006, 2009, and 2012). The most recent survey, whose results were used in the present research, tackles the perceived QoL in 79 European cities (Figure 1), all capital cities being included, (with the exception of Switzerland cities), together with between one and six more cities in larger countries ("Quality of Life in Cities - Perception Survey in 79 European Cities" 2015). The questionnaire was applied to approximately 500 inhabitants, and contains 29 questions which can be separated into five domains: people's satisfaction with their city, people's view about the city, environment, people's personal situation and the most important issues that the cities are facing.

Table 1. Domains taken into account and their items

Quality of urban amenities (Satisfaction with…)	**Quality of socio-economic context (Satisfaction with…)**	**Quality of urban environment (satisfaction with…)**
Public urban transportation	Buildings	Urban Green Areas
Health care services	Personal Job	Air Quality
Sports facilities	Presence of foreigners	Level of Noise
Cultural amenities	Integration of foreigners	Cleanliness
Public spaces	Housing prices	Metropolitan green areas
	Local administration	Measures against climate change
	Trust in local residents	Responsibility on local resources
	Safety	
	Level of Poverty	
	Personal financial situation	

From the applied questionnaire, only relevant questions were selected for this study. Therefore, the responses for 23 out of 29 questions were kept in the analysis. Furthermore, the items were divided into three different domains (urban amenities, urban environment, and socio-economic context) presented in the Table 1.

3.2 Data analysis

The survey data was structured according to Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree) plus 'I don't know/I cannot answer' alternative.

In order to standardize these discrete ordinal values for our analysis, the following steps were performed. Firstly, the percentage of each alternative out of total responses was calculated for all the cities. Secondly, 'I don't know' alternative was eliminated from the analysis and new percentages were calculated, without taking it into consideration. Subsequently each percentage was multiplied by a weight varying from 1 to 4 according to the level of satisfaction, thus obtaining a final score for each question and each city, ranging from 100 to 400:

$$Q_i = p_{sa} \times 4 + p_a \times 3 + p_d \times 2 + p_{sd} \times 1,$$

where Q_i – the final score of the item; p_{sa} –percentage of strongly agree answers, p_a - percentage of agree answers; p_d - percentage of disagree answers; p_{sd} - percentage of strongly disagree answers.

Finally, a synthetic score was calculated for the three domains listed in table 1 (Quality of urban amenities, Quality of socio-economic context, and Quality of urban environment) as following:

$$S_d = (Q_1 + Q_2 + \cdots + Q_n)/n,$$

where S_d – domain score and Q_1 …Q_n – the scores of the items belonging to the respective domain.

The survey included one more item, namely the General Satisfaction Score which was not included in any domain and it was used for calculating different correlations.

3.3.1 Spatial statistics

In order to assess the spatial patterns of perceptions on the quality of life in European cities, three spatial statistics methods were employed: hierarchical clustering which designed a typology of European cities according to the perceptions on the quality of life; local autocorrelation used to identify the local outliers and regression models (Ordinary Least Squares – OLS and Geographically Weighted Regression - GWR) – to measure the global and local correlation between each of the three domains and the general satisfaction.

Hierarchical clustering was performed using Grouping Analysis from Spatial Statistics Tools in ArcGIS; 3 to 5 classes clustering were tested and the optimal number of classes was evaluated, creating a final clustering with 3 classes, without spatial constraint.

Local autocorrelation was performed using Cluster Outlier Analysis (Anselin Local Morans I) form Spatial Statistics Tools and inverse distance method.

OLS was performed using Ordinary Least Squares from Spatial Statistics Tools; the general satisfaction was taken as a dependent variable and its three dimensions – socio-economic context, amenities and environment – as explanatory variables, thus comparing the slopes for the variables. GWR regression was performed using the Geographically Weighted Regression from Spatial Statistics Tools in ArcGIS; an adaptive method with 30 neighbours' bandwidth parameter was employed, as we consider this limit to be appropriate for cities vicinity. The tool was run three times as simple regressions, using general satisfaction as a dependent variable and each dimension as explanatory variable separately, for mapping the intensity of each correlation.

4. RESULTS AND DISCUSSIONS

The applied methodology revealed a new overview on the QoUL in Europe, highlighting spatial patterns that could not be spotted before, using ranking methodologies: clustering tendencies for the perception on QoUL, spatial outliers requiring special attention in comparison to their environment and regional tendencies in the relation between general satisfaction and different domains of QoUL .

4.1 From a statistical typology to regional patterns

Hierarchical clustering being a widely used data analysis tool (Lorr 1983) matches to the profile of the study, given the spatial variation between the four analysed dimensions, and the differences in perceiving the quality of life from one city to another. Therefore, the objective of the method is to highlight patterns that exist inside of the European territory. There are cities and

regions which share the same perception for quality of life, and their rank in this top of subjective viewpoints is also influenced by their spatial position, as perception is strongly biased not only by static indicators but also by the comparison with the vicinity QoUL (Bonaiuto et al. 1999).

The resulted typology contains three classes, corresponding to a general positive, negative and "in between" perception (Figure 2); the classes are well differentiated, the distance between domains from each class being larger than one standard deviation. Each of the classes is created according to differences that exist between perception on each of the four domains taken into account (socio-economic, amenities, environment and general satisfaction). Furthermore, the negative perception is situated with approximately two standard deviations (for each domain) from the mean value, while the "in between" perception is situated slightly negative to mean values. Finally, the positive perception has approximately one positive standard deviation from the mean value. Regarding the distribution of cities, most of them are situated into the highest class (34 cities), followed by second class (32 cities with a medium perception of QoUL) while nine cities are grouped into the third class (with a negative perception). The results highlight a strong spatial pattern on perceived QoUL and, on the other hand reveal a series of spatial outliers which have individual explanations for their presence.

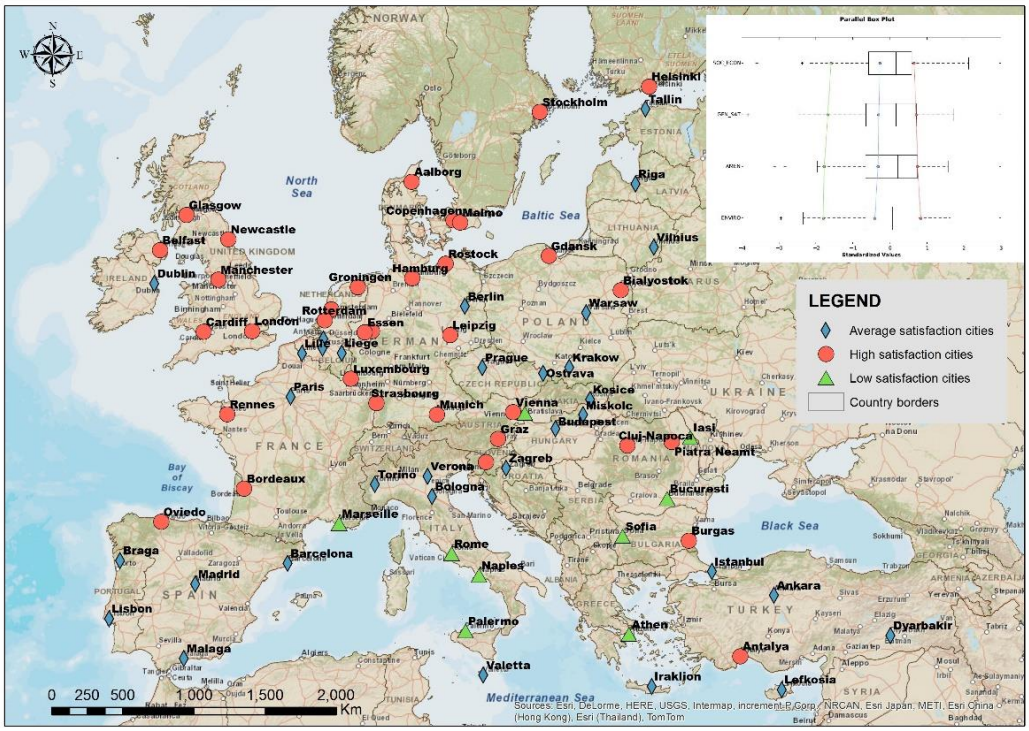

Figure 2. Hierrachical clustering for perceived QoUL in Europe

Cities that have a positive perception for QoUL are clustered on the Western and Northern side of the European continent. These cities are located inside of the "Blue Banana" (Lever 1999) with the exception of Belgian cities as well as Paris, Lille and Dublin. There is an evident fracture on perceived QoUL at the border of ex-communist states (Rostock, Leipzig, Vienna,

Graz and Ljubliana having a positive perceived QoUL), on the Eastern side of this barrier, only few exceptions being present. Two of them are located in Romania (Piatra Neamt and Cluj-Napoca), both having a strong redevelopment aid during the last decade; another two are located in Poland (Gdansk and Byalystock). Antalya, Burgas and Oviedo (which have a positive perception for QoUL) have a strong touristic profile, being top touristic destinations (Kayar and Kozak 2010).

The cities situated in the second class (”in between” perception) have a slightly negative standard deviation. Most of the cities are situated in the former communist countries. Some of these cities are placed inside the economic engine of European Union, their problems with immigrants and size (Paris and Brussells), or their industrial profile (Lille and Dublin) having a negative impact on perceived QoUL. Another group of cities is positioned in the Mediterranean area (highly developed cities from Spain or Northern Italy as well as cities from Mediterranean islands with an evident touristic profile -Valetta, Iraklion and Lefkosia).

The location of cities with a negative perception has a clear Southern pattern, with the exception of Bratislava (which is mostly a periphery of Vienna) and Iasi (which has a peripheral position inside the regional, national and European context (Nicolae 2010). The rest of the cities are situated in the Southern Italy - Naples and Palermo (where the economic development is strongly delayed), in Marseille (which has problems with immigrants and high rates for criminality) and within the Southern capitals - Rome, Athens, Sofia and Bucharest (which can be explained through their internal urban organization problems).

As a general perspective, there is a strong East-West and North-South gradient where the former communist cities together with big cities (capitals) and industrial ones form a compact group for “in between” and negative perceived QoUL, while most of the cities placed inside the core of European continent have a positive perceived QoUL.

4.2 Particular cities - spatial outliers

Cluster-Outlier Analysis revealed some interesting results, highlighting those cities which are highly different from their spatial context (Table 2), thus identifying strength and weaknesses which can be further employed in policy making.

Table 2. Outlier cities for each of the dimension taken into account

Category/ Outlier Type	**Amenities satisfaction**	**Environmental satisfaction**	**Social and economic satisfaction**	**General satisfaction**
High-High	Manchester, Cardiff, London, Rennes, Lille, Strasbourg, Luxembourg, Hague, Rotterdam, Groningen, Essen, Munich, Leipzig, Hamburg, Rostock, Berlin, Prague	New Castle, Manchester, Cardiff, Luxembourg, Groningen, Hamburg, Rostock, Aalborg	-	Hamburg, Rostock, Aalborg
High-Low		Piatra Neamt	Antalya	Burgas
Low-High	Bratislava	-	Lefkosia	-
Low-Low	Rome, Naples, Palermo, Valetta, Iraklion, Athens, Sofia, Bucharest, Istanbul, Ankara	Rome, Naples, Palermo, Valetta, Iraklion, Athens, Sofia, Bucharest,	Marseille, Torino, Rome, Naples, Palermo,	Rome, Naples, Palermo, Athens

		Budapest	Iraklion, Athens	

High-High outliers are those cities where the perception on the QoUL is higher than in its vicinity, although the vicinity has already high values on this perception. Concerning satisfaction with amenities, high-high outliers are mainly situated in the Western Europe; the high context is given by the general tendency of amenities to cluster, while the local high values are related to a greater attention paid by the local authorities to develop different urban facilities. For the satisfaction with the environment, most of the high-high outliers are smaller cities, facing less challenges with over population or crowding (Groningen, New Castle etc.) or former industrial areas, which faced important investments in urban renewal (Manchester, Rostock, Hamburg, Cardiff). For the socio-economic dimension, there are no high-high outliers. As a conclusion, Aalborg, Rostock and Hamburg are three outliers belonging to at least 2 categories, hence they are the best perceived cities in terms of the quality of life.

High-Low outliers are those cities where the perception on the quality of life is higher than in its vicinity, which has low values on this perception. Satisfaction with amenities does not have any outliers, while de environment satisfaction comprises one outlier – Piatra Neamt town of Romanian, located in a favourable, sub-Carpathian zone which has also benefited from urban environment improvement projects (Peptenatu et al. 2009) by accessing European funds; hence, it has a particularly satisfactory situation in comparison to its East-European vicinity. Two others high-low outliers are present in Turkey, where Antalya, as an important tourist resort has reap important financial benefits in comparison to other Turkish cities, thus recording a higher socio-economic satisfaction, and in Bulgaria, where Burgas records a higher overall satisfaction, due to the main reason (tourism development).

Low-High outliers are those cities where the perception on the quality of life is lower than in its vicinity, whereas the vicinity generally has high values on this perception. Only two outliers occur in this category: Bratislava, where the low satisfaction with urban amenities is relevant, being mostly a periphery of Vienna, affected by intense commuting and a higher level of expectation from inhabitants, (by comparing it with the capital of Austria), and Nicosia, whose spatial position and economic delay determines a low socio-economic satisfaction.

Low-Low outliers are those cities where the perception on the quality of life is lower than in its vicinity, which already registered low values in this matter. It is the case of most Southern cities of Europe, where many cities (Rome, Naples, Palermo, Athens, Iraklion) are affected on at least three dimensions of the perception. In general, capital cities or great metropolis are low-low outliers. Some noticeable exceptions are Bucharest and Sofia, which are outliers only for amenities and environmental satisfaction, while socio-economic and general satisfaction are high. Furthermore, Torino and Marseille are only outliers for the socio-economic dimension, probably due to the great number of immigrants which create problems within the cities.

4.3 REGIONAL DRIVING FORCES FOR THE GENERAL SATISFACTION

For evaluating the contribution of each of the three dimensions (amenities, environment and socio-economic context) to the general perception of QoUL, a linear regression model (OLS) was computed (Table 3), where the dependent variable was the General Satisfaction score and

Table 3. Linear regression model used for three dimensions of QoUL

the explanatory variables were the three domains. Table 2 presents the results of this regression; the most interesting parameter is the slope (a coefficient), whose value represent a measure of the importance of each domain in explaining the general satisfaction. Socio-economic context is the most important dimension, having the highest slope (0.788), while the others are approximately equal, by far less important (around 0.2). The environmental quality is slightly more important than the amenities quality.

Subsequently, a geographically weighted regression (GWR) was applied in order to highlight the variation of the regression model over space (Wheeler 2014). In the case of QoUL (and other

Summary of OLS Results - Model Variables

Variable	Coefficient [a]	StdError	t-Statistic	Probability [b]	Robust_SE	Robust_t	Robust_Pr [b]	VIF [c]
Intercept	0.049358	0.407388	0.121158	0.903900	0.440513	0.112048	0.911094	-----
SCOR_SOCIO	0.788484	0.202073	3.901975	0.000216*	0.221347	3.562210	0.000661*	2.329636
SCOR_EDILI	0.217250	0.109252	1.988522	0.050556	0.102972	2.109801	0.038350*	3.059478
SCOR_MEDIU	0.259846	0.133295	1.949401	0.055144	0.123260	2.108107	0.038501*	5.034253

phenomena that inquire a spatial geographic location), the regression coefficients vary over space. Namely, the influence of each domain taken into account can vary from a city to another. The GWR was applied in a context of 30 neighbour's cities (participant to the survey), and the results highlight the correlation score between each of the domains and the general satisfaction score.

4.3.1 The importance of amenities in the perceived general satisfaction

The highest correlation score between the presence of amenities and general satisfaction score characterise some of the Southern cities (Figure 3). Burgas, a top destination city from Bulgaria, records high values for perceived general satisfaction as well as a strong correlation with the presence of urban amenities. It is to be considered that local residents, which declare themselves satisfied with their QoUL, correlate this situation with high standards of urban amenities, as the city has capitalized this important advantage of being a top touristic destination (Bachvarov 1999). Cities with a high correlation and a low satisfaction score are the urban agglomerations (Bucharest, Istanbul, Rome, Naples and Marseille) where the access to urban amenities can be difficult due to long time travels or demographic pressure (Adamson, Clark, and Partridge 2004). The residents are aware of the need of accessing amenities in order to have a higher general QoUL. The inhabitants of rest of the cities (Verona, Bologna, Sofia, Ankara and Dyarbakir) consider as well that improving the urban amenities can boost the general QoUL.

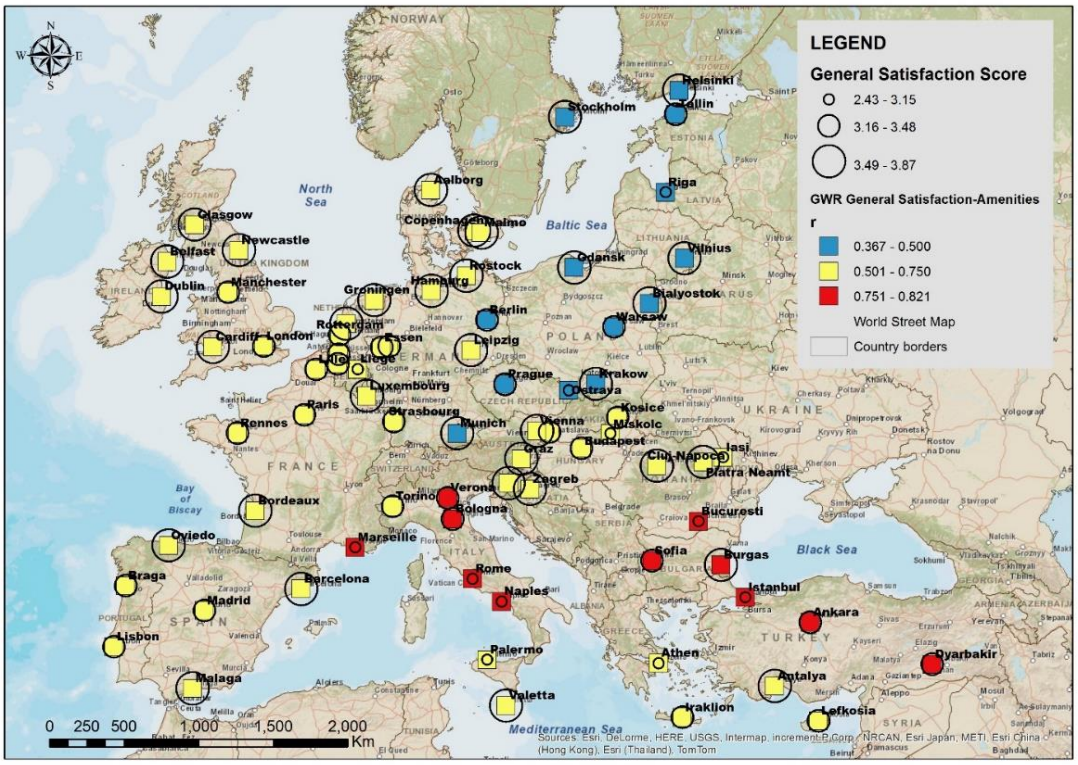

Figure 3. *The importance of Amenities in the perceived general satisfaction*

A medium correlation score (0.5-0,75) is to be noticed across all European continent, but there are obvious patterns in this class as well. The cities placed in the extended economic core of the Europe - the so called red octopus (Van der Meer 1998), with a general good perception of QoUL - form a first group; their inhabitants consider that amenities play an important role in their subjective satisfaction scores. Other cities grouped in this class are represented by touristic Mediterranean cities (Oviedo, Barcelona, Valetta, Malaga, Iraklion) where the urban development depends on the touristic flows. Worth mentioning is the group of cities with a low general satisfaction score and a medium correlation score. It comprises different situations, such as peripheral position (Iași, Palermo), industrial profile (Miskolc, Liege) or urban agglomerations with multiple problems (overcrowding, immigrants, high unemployment- Athens).

Cities with a low correlation score (<0.5) have a North-Eastern pattern. With the exception of Munich, all other cities are located in the former communist states. Whatever their level of general satisfaction, the presence of amenities does not have an important influence on their general perception of QoUL.

4.3.2 The importance of urban environment in the perceived general satisfaction

In most of the cities there is a strong correlation between the state of environment and general perception of QoUL (Figure 4). Therefore, the inhabitants from these cities believe that living in a clean environment will lead to a high QoUL. These cities can be divided into three groups, having a clear spatial pattern. Most of the cities - which have a high general satisfaction score (Central and Western Europe), together with Mediterranean touristic cities (Valleta, Antalya and

Burgas), also have a good perception for the quality of the urban environment. On the other hand, cities with a low general satisfaction score have a negative perception upon the urban environment, leading to the conclusion that improving the quality of the urban environment is a priority for increasing the general satisfaction of the inhabitants. These cities, most of them being South-Eastern capital cities (Rome, Sofia, Bucharest, Istanbul, Athens) have real problems (Stanilov 2007) regarding most of the items taken into consideration for evaluating the state of environment (such as air quality, green areas, or level of noise). These issues are highlighted by the lowest values for perception upon urban environment.

A relatively strong correlation (0,5-0,75) between the two domains analysed exists on most of the central and Eastern cities, which are situated into different phases of post-communist transition, and did not reached the desired level for the quality of environment. Some of the cities have a strong industrial profile (Iași, Miskolc, Ostrava, Riga) recording low values for air quality (Reche et al. 2011) and other environmental parameters. It is not a surprise that most of the cities are located in the former communist countries, were the compact city produces most of the urban environmental issues (agglomeration effect, overcrowding, lack of green areas) (Sykora and Bouzarovski 2012). These central and Eastern cities record low values for the quality of the urban environment, with the exception of the ones having a suitable natural position (such as Piatra Neamt, Bialystok).

Low correlation scores are present only in most of the cities from Iberian Peninsula. The inhabitants of these cities, having both a pozitive (Oviedo, Malaga) and negative (Lisbon, Braga, Madrid) perception of QoUL, consider that the condition of urban environment does not affect the general QoUL.

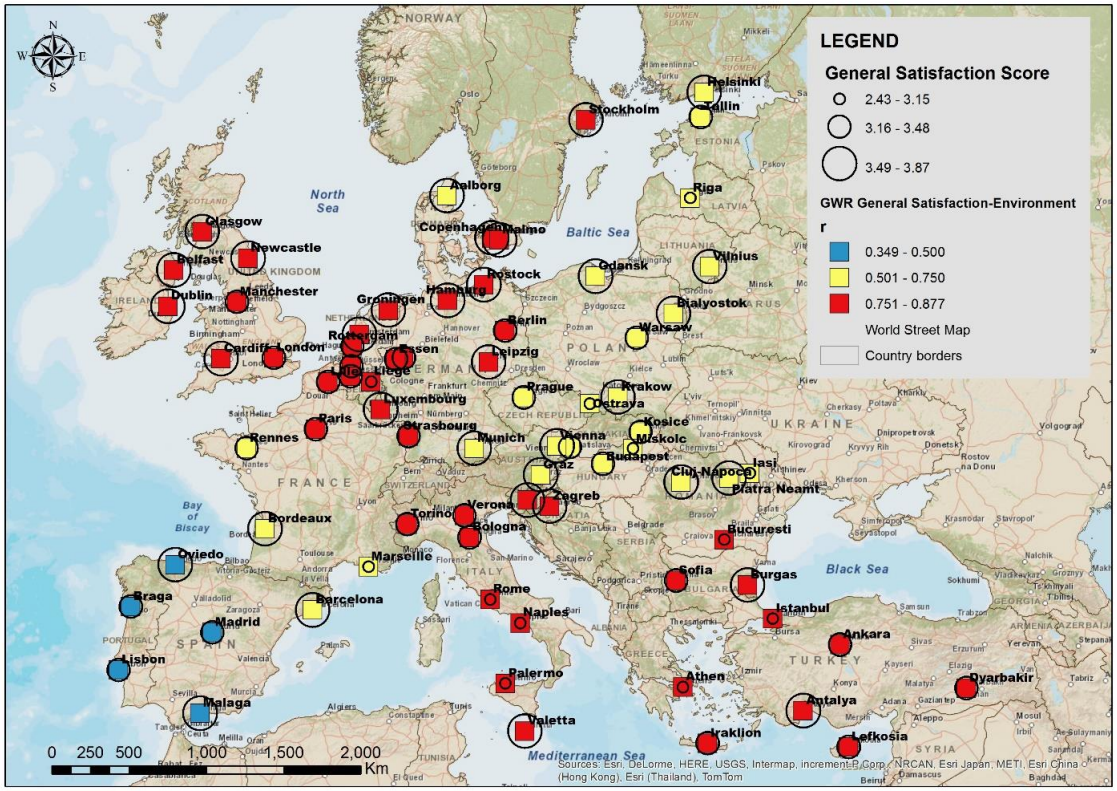

Figure 4. The importance of urban environment in the perceived general satisfaction

4.3.3 The importance of socio-economic context in the perceived general satisfaction

The cities with the highest correlation (> 0,75) are located in Western, Northern and Southern parts of the European continent (Figure 5) (with the exception of Iberian Peninsula); however different types of cities can be identified. A first category includes the cities with high values for general satisfaction score and a good perception for the socio-economic context. These cities are the ones located inside the economic engine of European Union together with top touristic destinations from Mediterranean region (Burgas, Antalya, Valletta, and Barcelona). These cities have a top position in quality of living, both for general satisfaction and for socio-economic context, as they have a high level of economic development. The second situation is represented by the cities with a low general satisfaction score (most of capital cities from the Southern Europe – Bucharest, Istanbul, Athens, Rome - and some Southern Italian cities – Naples, Palermo). They have as well, a general negative perception for the socio-economic context. As mentioned before, even though these cities play an important role in the regional economy, having a higher level of development than their surroundings, they are rather compared to other Western capital cities.

A medium correlation score is found in most of Iberian cities (with the exception of Barcelona), some cities from Central Europe (Prague, Graz, Zagreb, Ljubliana) and some Eastern cities (Gdansk, Cluj-Napoca, Piatra Neamț, Iași, Dyarbakir). With the exception of Madrid they share the same demographic characteristic - they are medium cities (smaller than 1 million inhabitants).

Cities with the lowest correlation score have a clear North-Eastern pattern. They are located in Hungary, Slovakia, Poland and Baltic countries. In these situations, there is a very low correlation between the two items taken into account. These are cities with a high general satisfaction score (Krakow, Bialystok, Vilnius) and low values for the socio-economic context. On the contrary, in other cities there is a negative general perception of life satisfaction (Riga, Miskolc, Ostrava) and a high appreciation for the socio-economic context, suggesting that other attributes of QoUL may be taken into consideration.

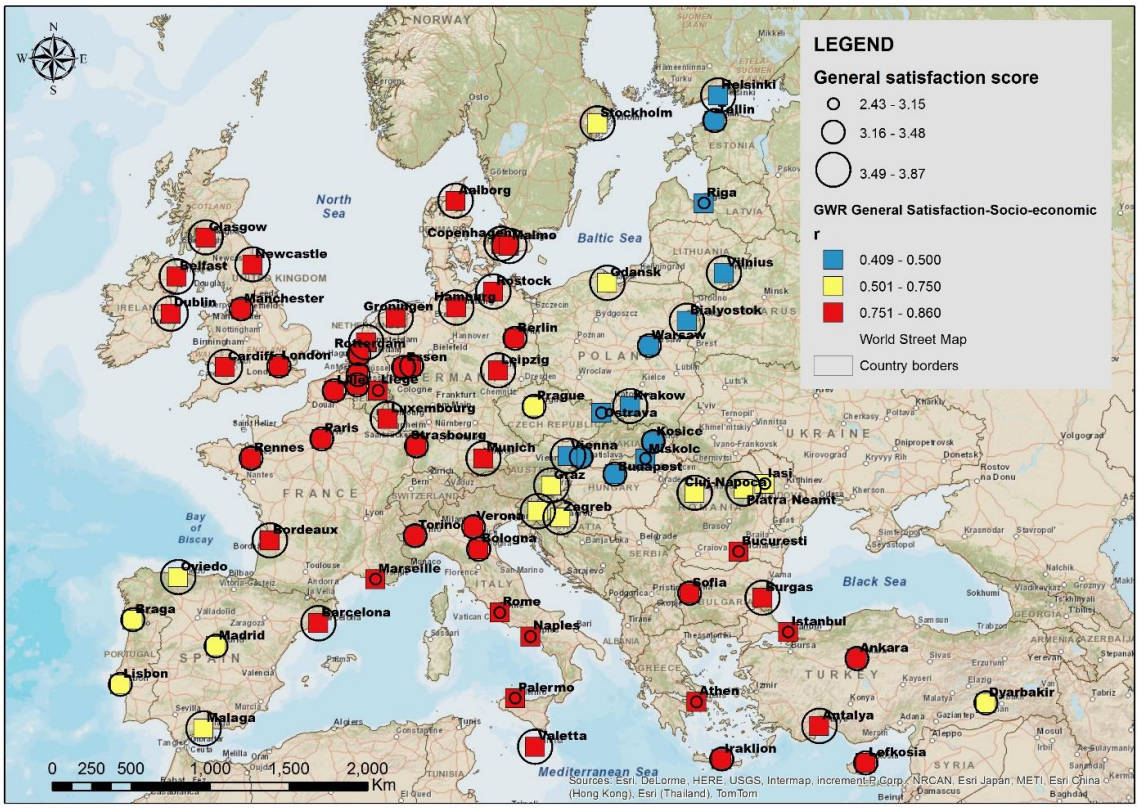

Figure 5. The importance of socio-economic context in the perceived general satisfaction

The GWR analysis revealed several general European patterns. It is easy to notice that Western Europe recorded the highest correlation coefficients for all domains as well as the highest levels of general satisfaction, confirming its civic maturity. Southern also faced high correlation coefficients for all the three domains, suggesting a high level of consciousness as well as elevated expectations, accompanied by a low general satisfaction level.

On the contrary, Eastern and Northern Europe is more complicated and heterogeneous, mainly due to the post-communist transition; for these areas, the QoUL it is likely to be influenced by other factors.

5. CONCLUSIONS

The methodological framework presented in this paper proposes a different approach for studying perceived QoUL, which can be used in future researches and policy design in order to bridge some gaps that affect the present viewpoints.

Hierarchical clustering represents an effective alternative to the methodologies based on ranking which often ignore the analysis of different domains or items included in the general QoUL. Such an approach is able to focus on particular strength and weaknesses derived from different dimensions of the researched concept. Moreover, the final results of Hierarchical clustering are easily understandable by different stakeholders and local policy makers; the results of the clustering method show that (1) the cities have a predominant North-South and West-East gradient, (2) the urban agglomerations (global cities) have smaller values than their vicinity, their inhabitants comparing the QoUL and its dimensions to a larger context.

Outlier cities identified by using spatial autocorrelation are characterised by a different behaviour in the regional context which is explained by local conditions rather than their geographical location. This approach can be used for implementing policies for both vulnerable and prosperous urban areas. Low-high outliers (Bratislava) may have a negative perception on QoUL due to the existing gaps between them and their vicinity, rather than due to objective reasons; hence they need caution in choosing the appropriate measures for improving the QoUL. On the other hand High-low outliers (Antalya, Piatra Neamt and Burgas) should be analysed at the appropriate spatial scale, being compared to cities which share the same features, rather than to their regional context. Low-low outliers (most of the Southern cities) are the most vulnerable cities and require policies for improving QoUL while high-high outliers (some Western cities) have the highest position according to the perceived QoUL, thus not having a higher standard to aspire.

GWR highlights the contribution of each domain (urban amenities, urban environment and socio-economic context) to the general perception on QoUL. It represents a useful tool which accordingly delineates spatial patterns.

Dominant cities located in the Western Europe have a clear pattern on perception of life satisfaction, their inhabitants considering that all three domains are very important. There are as well, cities with a touristic profile which have overcome their national or regional position (Valletta, Burgas, Oviedo, Antalya). On the other hand, the global cities (located in Western Europe) have a lower QoUL than their vicinity (rural or suburban areas well developed with different amenities).

Central and Eastern Europe (together with Iberian cities) indicate a weak connection between the three dimensions and QoUL, suggesting the existence of other elements and variables which construct the general satisfaction. Hence, the items of the survey may have not been appropriate for completely intercept the Eastern model on QoUL; other elements should be taken into account in future researches. There is a pattern for biggest cities in this area which have a clear dominant position inside the national context (Athens, Bucharest, Sofia, Istanbul, Warsaw etc.) but they record negative perception on QoUL as inhabitants tend to compare them with the Western cities.

The spatial context has an important role on the general perception for QoUL. By using spatial statistics approach, the present analysis (1) detects particular cases with a spatial relevance which cannot be observed by ranking approaches (simple statistics), (2) finds explanations for particular perceptions and thus prevent biases in policies influenced by the spatial context and (3) uses an objective approach for a subjective perception, demonstrating that individual perceptions can form spatially logic patterns.

In what concerns the planning measures for a sustainable development of the city, the policies which aims to increase the QoUL should be handled in a comprehensive way (Senlier, Yildiz, and Aktaş 2009), where each domain should be taken into account as well as the reference scale should be appropriately chosen according to typology of cities. While perception of QoUL has great variations from one individual to another (de citat), this study demonstrates that QoUL has large variations from one place to another as well.

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