5. HUMAN DEVELOPMENT EUROPEAN CITY INDEX: METHODOLOGY AND RESULTS

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Abstract

Knowledge externalities are considered by the Intellectual Capital Outlook as generator of long-term wealth. In this scenario, human capital has a key role in the local development. In this paper, we propose a novel methodology to determine the human development capacities of knowledge cities supported by a composite index of intangible factors of human resources. In this sense, we estimated a human capital index that covers two resources (individual and social conditions) and seven dimensions with 31 indicators from the urban audit database. We built a European cities ranking to 158 cities from 24 countries. The results show the growth of a new 4gap of divergence. Cities are competing for the attraction of wealth in a divergent scenario, in which human capital is the component that opens the diverging gap between them.

Keywords: human capital, index, development, cities, ranking
JEL Classification: F02, J24, O3, O57

1. Introduction

The economy of knowledge needs information and management systems aimed at estimating and monitoring the intangible capital as a primary source of wealth creation. Romer (1989) shows that there is a clear and robust relationship between

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human capital measured in terms of literacy with the national income per capita growth, proving the theories of endogenous growth. In this line, new knowledge-based economy models support knowledge as key factor of growth in the economies. The intellectual capital approach establishes new intangible measures (human and structural capitals) to the wealth of countries or regions.

The endogenous approach to a city (Vázquez, 2007), is supported in processes of growth and capital accumulation by culture, resources, and institutions (tangible and intangible factors), on the basis of which investment decisions are made. The growth capacity of a city could then be defined as the knowledge to use efficiently the existing development potential in the territory, offering a productive response adequate to meet the needs of the population at a specific time. In this sense, Lever (2002) analyzes the relationship between the quality of the knowledge-base and the economic change or growth of European cities with conclusive results. Storper (2010) studies three endogenous forces that permit differences in metropolitan areas growth: specialization, labor force and human capital issues, and institutions. Although the analysis of performance in the cities is a very novel subject, there are more people making a concerted effort towards capturing its essence by testing the sustainable growth of metropolitan areas or cities.

In this situation, in the recent decades theories of human capital and its effect on economic growth were developed, solving problems with specific indexes for measuring economic territories, or as part of general indicators for human and infrastructure aspects.

In this paper, the main objective is the estimation of a specific indicator for measuring the human capital of European cities with data available from Eurostat, with two dimensions: individual and social. For development, we address, in a first step, the main theories of human capital that is supported. We review the most relevant indexes, such as the United Nations human development indicator, and propose the calculation methodology from the perspective of the intangible capital knowledge by providing the main results and conclusions.

2. Human Development Theories

The importance of the human factor in the wealth of nations is not new, and this is confirmed in the work of Smith (1776), who considered that the fixed capital is formed not only by tools or buildings, but also by the value of habits acquired and used by all members of society. Later, Marshall (1931) limited their analysis to the measurable aspects of human behavior in terms of money, and that is reflected in the price mechanism, all this contributed to discussions and paved the way for a series of works grouped under the name of "Theory of Human Capital" published in the late fifties and early sixties in America. This theory was developed in particular by Becher (1964) and Schultz (1974), who considered the formation of an individual as its true value. Also, another line of thought was developed in business, namely "The School of Human Relations", dedicated to consider the individual and the group through their psychological and sociological aspects. In general, it is argued that it is important to consider the human relationships to explain the results of companies.

In the same way, from a macroeconomic perspective it was started to consider issues related to the existing values in economic development, placing self-interest as a fundamental human motivation factor. In this respect, the human development theory appeared.

Haq (1996) proposes a holistic concept to the human development paradigm where economic growth is essential, but highlights that "must be properly managed". In this sense, he establishes that equity, sustainability, productivity and empowerment are four essential components of human development and the key ways to link growth and human development are: "1. Invest in the education, health, and skills of the people, 2. Promote the equitable distribution of income and assets, 3. Structure social expenditures to promote human development, and 4. Empower people, especially women".

Kirdar (1986) offers new strategies to growth and social progress linked to human development, versus adjustment policies applied for countries in that time. First at all, he remembers that "the human element is vital for the resumption of sustained, balanced growth". Moreover, human capital is the key factor for viable growth on long term. Definitely, about human development theory, and growth, he proposes a balanced process where sustained development, efficiency and equity, growth and social justice, go together.

Finally, Sen (1999) connects development and economic growth with freedom. He completes the human development theory from the perspective that is based on a set of interconnected freedoms that allow individual and social development. According to his words: "…Political freedoms (in the form of free speech and elections) help to promote economic security. Social opportunities (in the form of education and health facilities) facilitate economic participation. Economic facilities (in the form of opportunities for participation in trade and production) can help to generate personal abundance as well as public resources for social facilities. Freedoms of different kinds can strengthen one another. (…) With adequate social opportunities, individuals can effectively shape their own destiny and help each other".

Accordingly, the human development theory is a major synthesis that is probably not confined within the bounds of conventional economics or political science, nor even within the political economy that relates the two. From these approaches, there are many researches that are being made to analyze the economic development from a human perspective. In this sense, we could emphasize among others the works of Seabrook (1993), Max-Neff (1994), Ozay (1995), Raff (1996), Mehrotra and Jolly (1997) or Unceta (2001).

At the end of XXth century appears a new contribution to the human development theory: the sustainable development theory. Usually, it is defined according to WCED (1987) as: "economic development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs". Concretely, this approach adds a new ecological perspective to the social and economic dimensions.

These contributions in the perspective of development economics have had considerable impact in the formulation of the Human Development Report (1990) headed by Mahbud ul Haq, published by the United Nations Development

Programme. This first Report on Human Development opened with the premise: "People are the real wealth of a nation. The basic objective of development is to create an enabling environment for people to enjoy long, healthy and creative lives. This may appear to be a simple truth. But it is often forgotten in the immediate concern with the accumulation of commodities and financial wealth". Simply, that statement has led all the subsequent reports, establishing as a global guide to human development and estimation of social and economic indicators on the subject.

A radical contribution to human and economic development was the concept of capability developed by Sen. He argues that the development does not end in increased production and, therefore, its estimation using disposable income (or GDP per capita) is insufficient. The development has to do rather with the things that people can really do or be (functionings) and, hence, with the capabilities they have, understood as opportunities to choose and take one or another kind of life. From this perspective, the quality of life depends on what the subject is able to achieve, the ways he is able to live, and not on his income, availability of social services or satisfaction of basic needs.

From theses contributions, several scholars have developed human development indexes that we collect in the following section.

3. Human Development and Indexes

Human capital has been measured primarily through indicators or variables related to education, such as literacy or qualification of the inhabitants of a territory (Romer, 1989).

Subsequently, given the scope and endogenous growth factor, the first composite indices are developed. We highlight the Human Development Index (HDI). It is an initiative of the Pakistani economist Mahbub ul Haq and the ideas of capacity, developed by Sen, to rank countries from other variables that were not traditionally used in economy (GDP, trade balance, energy consumption, unemployment, etc.), education (literacy rate, enrollment by level of education, etc.), health (birth rate, life expectancy, etc.) or other areas (military spending). The HDI aims to measure these variables through a composite index, using indicators that relate to the three mentioned aspects.

However, the HDI has received various criticisms. For example, Wolff, Chong and Auffhammer (2011) consider that there are errors in the statistics of health, education and income used to build the index. In particular, they identify three sources of data error: updating process, formula and limits of development status for countries; they propose a simple statistical framework to calculate country specific measures of data uncertainty and investigate how data error biases rank assignments.

The index has also been criticized as "redundant" and a "reinvention of the wheel", measuring aspects of development that have already been exhaustively studied (McGillivray, 1991 and Srinivasan, 1994.) It has been further criticised for an inappropriate treatment of income, lacking year-to-year comparability, and assessing development differently in different groups of countries (McGillivray and White, 2006).

Basu (2005) said that Human Development in the true sense should embrace both material and moral development.

A few authors (Noorbakhsh, 1998, García del Valle and Puerta, 2001, Hastings, 2011) have proposed alternative indices to address some of the index's shortcomings. Here, Noorbakhsh (1998) suggested some upgrades in the components and index structure. Hastings (2011) proposed the "classic" human development index covering 232 countries, whereas the United Nations Development Programme's 2010 changed its formulation for the HDI, and also reduced coverage to 169 countries.

Nevertheless, the HDI index continues to be covering most countries of the world and is the most commonly used for development planning.

Finally, other general indicators on different dimensions were developed for different economic territories, also for cities. We review the more relevant in the last years. Most indicators underlying the aggregate indices are based on variables measured in pieces or weights. In practice, the composition of an index has indicators or variables, classified in dimensions, as a foundation. Based on the different indices used we find three types of dimensions: social or human, which introduce quality of life conditions; economic, where GDP per capita is the key indicator; and infrastructure, where indicators related to institutions, markets and the environment are used. Usually, experts work with a percentage scale, where they include rescaled variables in function of limits values that change from 0 to 100. In fact, they use a cross sectional database with structural conditions. Finally, the authors apply subjective weights to build the index, and in some cases are advised by experts in urban government or planning.

Indexes are applied as a ranking to show economic power or social conditions in cities, but they do not consider monetary values. Below, we outlined the best known made to city level, with specific dimension in human capital:

1. The City Development Index (CDI) was developed for the Second United Nations Conference on Human Settlements (Habitat II) in 1996. The technique used to construct CDI is similar to the HDI and is based on five sub-indices: City Product, Infrastructure, Waste, Health and Education, all of them range from 0 to 100.

2. The Global Cities Index (GCI) by ATKearny, first released in 2008 and again in 2010 and 2012, is unique in that it measures global engagement of 66 cities with 25 metrics across five dimensions weighted with expert information: business activity (30%), human capital (30%), information exchange (15%), cultural experience (15%), and political engagement (10%). GCI is measured in scale 0 to 10.

3. Global Economic Power Index (GEPI). PricewaterhouseCoopers and the Partnership for New York City, 2012 published the fifth edition. They rank 27 cities across each of its ten key dimensions from 60 variables: intellectual capital and innovation; technology readiness; transportation and infrastructure; health, safety and security; sustainability and the natural environment; economic clout; ease of doing business; cost; demographics and livability; and city gateway.

4. Global Power City Index (GPCI). The Institute for Urban Strategies at The Mori Memorial Foundation in Tokyo issued a comprehensive study of 40 global cities

(2012 version) from 2008. The ranking is based on addition of scores of six overall categories: economy, research&development, cultural interaction, livability, environment, and accessibility, with 70 individual indicators among them.

5. Global City Competitiveness Index (GCCI). In 2012, the Economist Intelligence Unit (The Economist Group), ranked the competitiveness of global cities according to their demonstrated ability to attract capital, businesses, talent and visitors. This index compares 120 cities and examined 31 indicators for each. Indicators were grouped under eight distinct, thematic categories: economic strength, human capital, institutional effectiveness, financial maturity, global appeal, physical capital, environment and natural hazards, and social and cultural character. Weights are subjective, generated from expert interviews.

Next, we propose a specific index of human development applied to cities with two dimensions supported on the intellectual capital approach.

4. Human Development City Index (HDCI): Methodology

In the analysis of the intellectual capital is usual to consider two large groups of capitals identified as intangibles: human (HC) and structural (SC). This situation appears also at the macroeconomic level and, therefore, these dimensions are considered when the national, regional or city intellectual capital is analyzed.

Lopez *et al*. (2011) and Alfaro *et al*. (2011) established that human capital has two dimensions: individual (in) and social (sc), and structural capital comprises: process (PC), commercial (CC), image (IC), R&D+I (RDC) and environmental (EC) capitals. Moreover, they consider a residual capital (RC) as an error measurement. Thus, the intellectual capital can be calculated as:

$$IC = HC + SC + RC \qquad (1)$$

where:

$$HC = HCin + HCsc \qquad (2)$$

$$SC = PC + CC + IC + RDC + EC \qquad (3)$$

Taking into account one of the components of intellectual capital, concretely, the human capital, we have developed a new Human Development City Index (HDCI). Concretely, using a geometric average such as recommended when we must average indicators in percentage (Böhringer and Jochem, 2007), we can define HDCI as:

$$HDCI_c = \sqrt[\alpha+\beta]{HC_{in_c}^{\alpha} \cdot HC_{sc_c}^{\beta}} \qquad (4)$$

where: HDCI is defined to 'c' cities, and α and β are different weights of each human capital components estimated using a principal component analysis that consider the relationships between components. Thus, we guarantee an objective procedure in the weighting that does not use arbitrary weightings based on subjective criteria.

In order to measure each of the dimensions, we established a set of indicators that have been selected on the basis of literature review and the available data in the urban audit database from Eurostat. We used this database because it is the most important information source available at city level, although the use of this database has a limitation because it provides information only about the European cities. Specifically, we use 9 indicators for the individual human dimension and 22 indicators for the social human dimension.

Thus, the individual dimension was measured using the indicators showed in Table 1 concerning population (dimension and aperture) and livability, while the social dimension considered five components: health; safety; labor market; education; and culture conditions (Table 2).

Table 1

Individual Human Dimension Indicators

Indicator
Total resident population
Residents who are nationals
Residents who are not nationals
Total number of households
Number of dwellings
Number of houses
Number of apartments
Average price for an apartment per m2
Average price for a house per m2

Table 2

Social human dimension components

Dimension	Indicator
Health	Number of live births per year
	[1] 100 – Index: Total deaths per year
	Number of hospital beds
Safety	100 – Index: Number of deaths per year due to suicide
	100 – Index: Number of murders and violent deaths
	100 – Index: Number of car thefts
	100 – Index: Number of domestic burglary
	100 – Index: Number of deaths in road accidents
Labor Market	Total Economically active population
	100 – Residents unemployed
	Residents in self employment
	Residents in paid employment
	Total full-time employment
	Total part-time employment
	Rate: Full time/Part time employment

Dimension	Indicator
Education	Number of residents (aged 15-64) with ISCED level 0, 1or 2 as the highest level of education
	Number of residents (aged 15-64) with ISCED level 3or 4 as the highest level of education
	Number of residents (aged 15-64) with ISCED level 5 or 6 as the highest level of education
Culture	Number of cinema seats (total capacity)
	Number of museums
	Number of theatre seats
	Number of public libraries (all distribution points)

Note: [1] Indicators preceded by *100-* indicate a transformation of limits, to present lower values coinciding with worst conditions.
Source: Own elaboration from variable definitions of Urban Audit Database (EUROSTAT).

In Tables 1 and 2 two kinds of indicators appear: absolute, normalized in per capita terms, and efficiency, on a percentage scale. In order to normalize, when the indicator does not have a percentage scale, the variables have been rescaled assigning 100 to the highest value and 0 to the lowest. As a result, all the variables generated by the indicators have values ranging from 0 to 100 (minimum and maximum). On the other hand, some indicators require a transformation of limits, to present lower values coinciding with the worst conditions. For example, in the safety sub-dimension of the social human dimension, for instance, in the case of death due to suicide, we change the limits with this difference, the optimum situation being no deaths at all due to this cause.

To establish the weights for each component we used a principal component analysis. As it is impossible to directly assign weights to each indicator, we have transformed them into the same number of principal components (P) as indicators available n:

$$P_n = \sum_{n=1}^{k} u_n x_n \tag{5}$$

where: u represents the characteristic vectors of each principal component and x the indicators (variables). Using these components, we build one index for each dimension by weighting each component in accordance with the percentage of variance retained by each (α_i in individual and β_i in social), but in accordance with a geometric mean.

$$HC_{in} = \sqrt[\sum_1^h \alpha_i]{\prod_{i=1}^{h} P_{HC_{in}n}^{\alpha_i}} \tag{6}$$

$$HC_{sc} = \sqrt[\sum_1^t \beta_i]{\prod_{i=1}^{t} P_{HC_{sc}n}^{\beta_i}} \tag{7}$$

Using the components in equation 4, we can determine the Human Development City Index, where, α and β in equation 2 are the percentage of variance retained by each component.

5. Results and Discussions

The cities selection was developed on the basis of information available for the 31 indicators selected. Concretely, we have applied the model for 158 cities in 24 European countries, with the last data available from 2009. In the case where data is not available, we apply the constant structure assumption and we consider the latest data available for this indicator. The results are presented in the appendix, which shows the index in percentage to provide comparable results among cities and to facilitate the disaggregation for each component considering the different dimensions.

First, the results show that both dimensions are independent, i.e. the correlation between the two is practically nonexistent, -0.2. In this sense, the individual conditions (livability and population dimension and aperture) are closer to the condition of large cities with higher incomes. The dispersion is greater in this dimension and the highest positions are obtained by the Northern cities (in Germany, France, Denmark and Sweden). However, the values of social dimension are more concentrated to the analyzed cities. Here, the best positions are for the Italian and Spanish cities.

The HDCI values are dispersed to the European cities. The top 5 cities are München, Zürich, Düsseldorf, Regensburg and Paris. The capital cities are generally better positioned. However, the highest values are for the cities of Northern and Central Europe, later the South Europe. Finally, the Eastern Europe cities are positioned at the end of the ranking (from Poland, Bulgaria, Romania and Lithuania), despite being intensive territories in training human capital. Is a divergent indicator in endogenous sense, i.e., has higher values for the richest cities.

We have developed an efficient technique for calculating a relevant indicator for comparing the living conditions and social skills for the European cities. In the estimation, we collect all of livability and social dimensions to a territory, achieving linear independence of them. It is therefore a robust estimator of competitiveness and social living conditions that also measured endogenous capacity development through human resources.

6. Conclusions

In a scenario in which knowledge is an essential resource, cities face the challenge of incorporating it into their development. In order to achieve this, intangible factors should be measured on skills and social conditions of their inhabitants. This key factor is human capital that goes beyond the measures of literacy of their inhabitants.

Therefore, the measurement systems should be modified to obtain composite indices objectively, to collect these factors.

In this work, we detail a proposal for estimating a human capital index which takes into account two visions: individual and social, and seven dimensions with 31 indicators collected by Eurostat.

This index allows determining a ranking of 158 cities from 24 European countries based on human resources from a perspective of social conditions and livability. The results show a growing new gap of divergence. Cities are competing for the attraction of wealth in a divergent scenario, in which human capital is the component that opens the diverging gap between them.

In view of the achieved results, challenges and new research lines appear:

- Further analysis of the results and discussion of possible cluster of cities according to the different dimensions.
- Estimating, through a panel data model, the relationship with growth and changes in the last stage of economic recession.
- Determining the impacts on the development of knowledge cities of measured human resources.
- Completing the index with the perspective of sustainability and infrastructure.

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Appendix

Values of HDCI and Dimensions

Country	City	HC$_{in}$	HC$_{sc}$	HC
Belgium	Bruxelles	40.567	51.548	42.830
	Antwerpen	41.269	49.585	43.295
	Gent	43.482	48.983	44.972
	Charleroi	39.071	49.777	41.597
	Liège	40.379	49.441	42.600
Bulgary	Sofia	32.789	48.079	36.611
	Plovdiv	29.528	49.816	34.044
	Burgas	33.803	50.534	37.476
	Ruse	34.343	49.420	37.876
Denmark	København	53.178	48.739	52.308
	Aarhus	43.765	49.401	45.211
Germany	Berlin	53.716	49.394	52.760
	Hamburg	49.888	49.006	49.851
	München	58.682	48.178	56.361
	Köln	52.305	48.712	51.651
	Frankfurt	54.757	48.489	53.470
	Essen	52.576	48.231	51.819
	Stuttgart	52.528	48.812	51.826
	Leipzig	55.472	46.776	53.862
	Dresden	51.148	47.542	50.697
	Dortmund	51.327	48.495	50.901
	Düsseldorf	55.689	48.782	54.189
	Bremen	50.153	48.237	49.999
	Hannover	53.031	47.586	52.111
	Nürnberg	51.182	48.538	50.794
	Bochum	48.893	48.443	49.062
	Bielefeld	46.965	48.708	47.617
	Halle (Saale)	54.762	45.221	53.201
	Magdeburg	53.491	46.174	52.340
	Wiesbaden	51.767	48.144	51.206
	Göttingen	49.143	46.549	49.120
	Mülheim a.d.Ruhr	51.144	49.896	50.859
	Moers	43.131	47.947	44.649
	Darmstadt	52.164	48.564	51.534
	Trier	47.194	46.967	47.681
	Freiburg im Breisgau	46.364	47.031	47.057
	Regensburg	55.901	45.930	54.105
	Frankfurt (Oder)	52.065	45.852	51.253
	Weimar	47.441	47.249	47.886
	Schwerin	53.676	46.662	52.518
	Erfurt	49.699	46.089	49.504

Country	City	HC_{in}	HC_{sc}	HC
	Augsburg	51.838	47.287	51.195
	Bonn	50.005	47.950	49.868
	Karlsruhe	48.913	47.908	49.041
	Mönchengladbach	47.448	48.625	47.979
	Mainz	50.330	48.170	50.128
	Kiel	50.985	47.824	50.596
	Saarbrucken	53.882	48.108	52.786
	Potsdam	47.984	47.204	48.293
	Koblenz	50.154	46.889	49.904
Estonia	Tallinn	43.067	45.974	44.489
	Tartu	40.317	45.174	42.346
	Madrid	43.918	53.718	45.525
	Barcelona	44.960	53.606	46.329
	Valencia	44.885	53.074	46.248
	Sevilla	38.482	54.105	41.274
	Zaragoza	41.032	53.316	43.257
	Málaga	36.675	55.391	39.867
	Murcia	36.002	55.371	39.328
	Valladolid	39.642	53.624	42.176
	Palma de Mallorca	40.246	55.265	42.700
	Santiago de Compostela	42.217	52.411	44.149
	Vitoria	37.127	53.121	40.176
	Oviedo	42.359	52.892	44.278
Spain	Pamplona	38.776	52.847	41.471
	Santander	42.415	53.146	44.332
	Toledo	36.184	53.008	39.425
	Badajoz	35.780	55.305	39.149
	Logroño	41.551	54.976	43.719
	Bilbao	40.413	52.712	42.752
	Córdoba	35.750	54.988	39.120
	Alicante	44.563	55.600	46.099
France	Paris	55.527	50.094	54.169
	Lyon	42.609	49.578	44.330
	Strasbourg	43.039	48.719	44.619
	Bordeaux	44.139	49.045	45.480
	Nantes	41.545	49.263	43.495
	Lille	37.952	49.860	40.726
	Saint-Etienne	42.382	49.544	44.153
	Le Havre	39.480	49.715	41.913
	Nancy	45.137	48.056	46.187
	Metz	40.957	48.887	43.023
	Orléans	41.302	49.508	43.318
	Dijon	44.931	48.527	46.057
	Clermont-Ferrand	46.059	48.448	46.912
	Grenoble	42.328	49.739	44.121

Country	City	HC_{in}	HC_{sc}	HC
	Toulon	47.029	50.132	47.749
	Aix-en-Provence	40.071	50.919	42.420
	Marseille	41.797	50.013	43.723
	Nice	51.161	50.829	50.932
	Roma	40.083	54.334	42.545
	Milano	48.948	54.489	49.449
	Napoli	33.923	55.588	37.661
	Torino	44.675	55.834	46.195
	Palermo	34.570	55.563	38.182
	Genova	45.846	55.345	47.089
	Firenze	45.667	54.675	46.922
Italy	Bologna	50.798	53.762	50.830
	Catania	40.585	55.531	42.975
	Venezia	44.849	54.003	46.260
	Verona	41.873	54.534	43.957
	Cremona	42.875	52.606	44.669
	Trento	40.718	53.503	43.017
	Ancona	41.805	53.281	43.860
	Cagliari	39.498	51.067	41.979
Latvia	Riga	41.534	44.104	43.212
Lithuania	Vilnius	35.679	44.164	38.730
	Panevezys	33.627	44.248	37.143
Luxemburg	Luxembourg (city)	50.352	50.484	50.297
	Budapest	44.075	45.967	45.255
Hungary	Miskolc	36.974	43.334	39.687
	Nyiregyhaza	34.375	45.667	37.780
	Pecs	36.974	45.882	39.809
	's-Gravenhage	46.596	52.158	47.524
Netherlands	Amsterdam	50.765	52.595	50.739
	Rotterdam	45.940	51.823	47.004
	Utrecht	43.286	51.934	44.960
	Groningen	45.114	50.906	46.323
	Nijmegen	41.875	50.568	43.808
Austria	Wien	52.714	49.820	52.037
	Warszawa	42.124	48.215	43.890
	Lodz	39.438	45.839	41.707
	Krakow	35.187	47.204	38.471
	Wroclaw	35.497	47.394	38.720
	Poznan	35.220	46.570	38.473
Poland	Gdansk	35.778	47.239	38.933
	Szczecin	33.926	46.163	37.447
	Bydgoszcz	32.635	47.919	36.485
	Lublin	32.789	47.399	36.593
	Katowice	38.202	47.689	40.838
	Lisboa	51.669	51.156	51.338

Country	City	HC$_{in}$	HC$_{sc}$	HC
Portugal	Porto	51.592	50.720	51.251
	Setúbal	39.419	51.849	41.944
Romania	Bucuresti	33.191	47.592	36.915
Slovenia	Ljubljana	40.761	46.481	42.756
	Maribor	39.808	44.946	41.944
Slovakia	Bratislava	42.400	47.523	44.067
	Trencín	34.493	44.362	37.821
Finland	Helsinki	51.327	47.602	50.836
	Tampere	49.192	45.674	49.093
	Turku	52.157	45.696	51.309
Sweden	Stockholm	51.475	48.960	51.045
	Göteborg	44.938	47.811	46.022
	Malmö	44.781	48.278	45.929
United Kingdom	London	43.747	53.755	45.392
	Birmingham	37.430	52.937	40.411
	Leeds	39.421	51.528	41.934
	Bradford	36.468	53.146	39.654
	Liverpool	43.047	52.392	44.794
	Manchester	41.324	53.702	43.499
	Sheffield	39.720	52.620	42.206
	Bristol	40.368	52.480	42.708
	Newcastle upon Tyne	40.166	51.507	42.516
	Leicester	36.915	53.789	40.025
	Portsmouth	39.361	51.642	41.891
Norway	Oslo	53.540	49.731	52.652
	Bergen	46.437	49.507	47.262
Switzerland	Zürich	58.115	49.578	56.059

Source: Own elaboration using information from Urban Audit Database from Eurostat.