
THE URBAN DEVELOPMENT INDEX - A PROPOSAL FOR THE ROMANIAN CITIES

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Abstract

Due to the fact that transport facilities allow facile movement of inhabitants across continents and mobility is rapidly increasing, assessing and monitoring the urban development in the nowadays context when the urban areas are the main economic and social evolution driver has become increasingly important both for policy makers, and for the business environment. Therefore, starting with the human development index and using publicly available data we propose in this paper an aggregate index that can be used for monitoring the urban development for the case of the Romanian cities. The index will be used to assess the urban development of the Romanian cities, over the period 2009 – 2018, clustered according to the criteria used in the Regional Operational Program.

Keywords: urban development, aggregate index, regional development program

JEL Classification

I14, I24, C25, C35

Introduction

The main objective of the paper is to assess the evolution of the urban development of the Romanian cities using a multi-criterial approach, including aspects related to education, longevity (health), employment and infrastructure, over the period 2006 – 2017.

Literature review and general framework

The specific scientific literature provides a strong theory linked to the use of the HDI index, which actually provides a quantitative assessment of human capital. The HDi index includes and characterizes the human development level in the analyzed countries and regions. (Gregory Mankiw, David Romer, David N. Weil, 1992)

An important issue is the comparison between the Human Development Innovation Fund (HDIF) and HDI showing human development with flow variables offering a better human development performance in terms of health and education than the traditional measure which is a mixture of stock and flow variables. (Hou, Walsh and Zhang 2014)

Methodology and data

The methodology proposed in this paper is based on the general methodology proposed by two aggregate indexes. The most prestigious among them is the Human Development Index which is constructed by the aggregation of three main dimensions: health, education and economic development. The second is the human local development index (IDUL), proposed for the Romanian municipalities in the Competitive Cities report of the World

Bank. The index proposed by the world bank includes four dimensions, altering one of the three dimensions included in HDI, namely the economic one, and adding another one referring to infrastructure. The main limitation of IDUL is represented by the fact that it is very difficult to compute on a yearly basis and provide continuity in this way since it uses data that are not calculated on a yearly basis and as a consequence are not publicly available. Another important limitation of the index is represented by its computation method which is data driven and does not allow for easy replicability as in the case of the human development index (Oțoiu, Bere & Silvestru, 2017).

Thus, we propose an alternative aggregate index entitled the urban development index that will be easily computable on a yearly basis for all Romanian Urban areas (cities and municipalities) Even though the index uses proxies based on available data and its values might not permit comparison among different type of urban areas, analyzing its dynamic will help us reach the objective of the paper.

The index is constructed by aggregating the following four dimensions: education, longevity, economy and infrastructure. The second dimension replaces the health dimension and is proposed as an approximation of the replaced one. The first three dimensions are based on a single variable while the fourth dimension includes five individual variables. All eight variables are composite variables being standardized with the help of a ninth variable, namely population so that they are comparable across and among cities with significantly different sizes. The data for all nine variables are available in the TEMPO database of the National Institute of Statistics for all urban areas in Romania.

Table no. 1 Variables and codes

Variable	Tempo Code	Dimension	Period
Population enrolled in school	SCL103D	D1	2006 - 2017
Number of deaths	POP206D	D2	2006 - 2017
Average number of employees	FOM104D	D3	2006 - 2017
Number of existing houses	LOC101B	D4.1	2006 - 2017
Available green area	GOS103A	D4.2	2006 - 2017
Length of running-water system	GOS106B	D4.3	2006 - 2017
Length of gas system	GOS116A	D4.4	2006 - 2017
Length of sewage system	GOS110A	D4.5	2006 - 2017
Total population	POP108D	-	2006 - 2017

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The steps of the methodology are as follows:

1. For each individual variable an average of three years is computed. Thus, for each year the value of the indicator is represented by the average of the previous three years.
2. Each individual variable is standardized using population so that indicators measured as unit/inhabitant are obtained.
3. Each individual variable is rescaled so values between 0 and 1 are obtained. Values close to 0 represent a very poor development level while values close to 1 show a high development level.
4. For the five variables included in the fourth dimension, an aggregated indicator is computed so that it represents the dimension.
5. The four dimensions are aggregated using the following system of weights: 20%, 20%, 20% and 40%.

Table no. 2 Dimensions and their structure

D1: Education	D2: Longevity	D3: Employment (Economy)	D4: Infrastructure
Population enrolled in school / Total population	Number of deaths / Total population*	Average number of employees / Total population	Number of existing houses / Total population Available green area / Total population Length of running-water system / Total population Length of gas system / Total population Length of sewage system / Total population

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Empirical results

After computing the index for all 320 urban areas of Romania five clusters are constructed using the clustering mechanism used by the Regional Operational Program (ROP) over the programming period 2007 – 2013.

The first group includes the capital city and the seven large cities, one, for each region, named concentration poles, namely: Cluj-Napoca, Iasi, Timisoara, Craiova, Constanta, Ploiesti and Brasov.

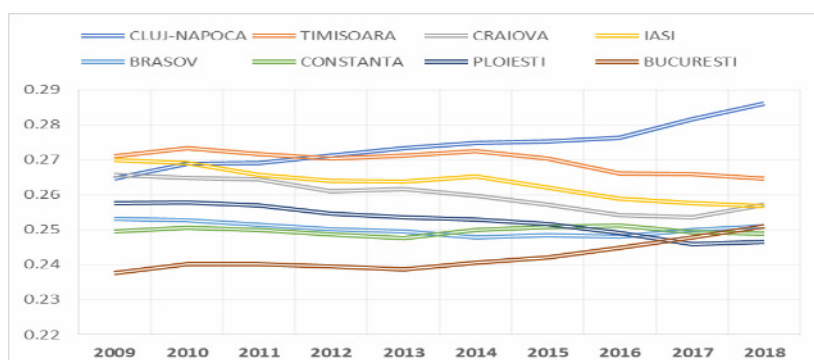


Fig. no. 1 Evolution of the index for the seven growth poles and Bucharest

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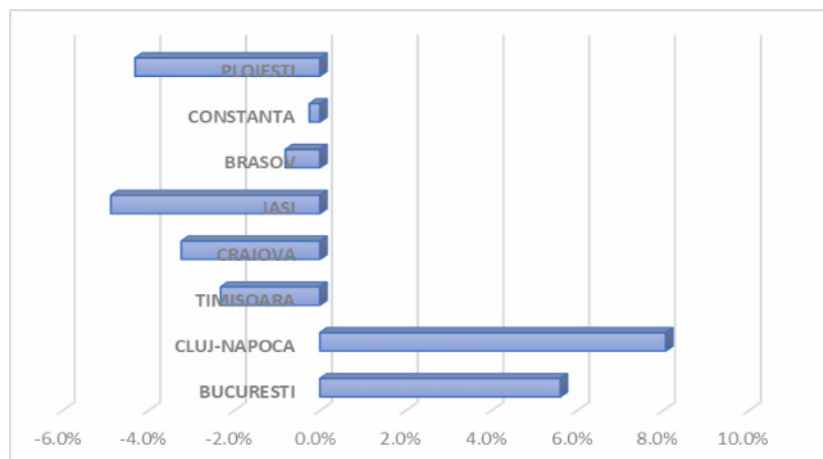


Fig. no. 2 Evolution of the index for the seven growth poles and Bucharest
Sursa: Author's work

Noteworthy is the fact that only two of the largest eight cities record an increase of the index over the 2009 – 2018 period. Cluj Napoca recorded an increase of almost 8%, and Bucharest recorded an increase of around 5.6%, while Iasi has recorded the highest decrease.

The second group includes the thirteen second tier cities named urban development poles: Suceava, Ramnicu Valcea, Baia Mare, Sibiu, Oradea, Pitesti, Targu Mures, Satu Mare, Arad, Deva, Bacau, Galati and Braila.

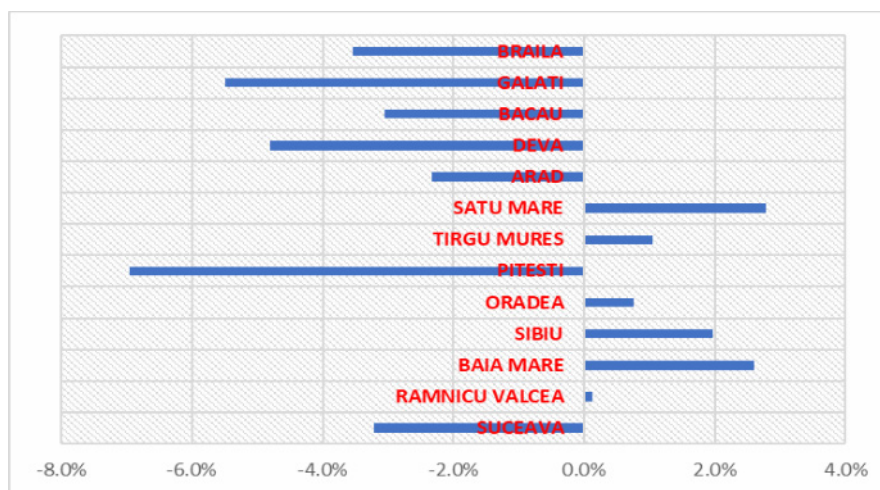


Fig. no. 3 Evolution of the index for the thirteen urban development poles
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In the second group only six cities record an increase over the analyzed period and the remaining seven record decreases with the maximum decrease of almost 7% for Pitesti.

The fourth group includes all other urban areas with more than 10 000 inhabitants in 2007 (184 cities) which were cluster in the group of urban centers according to the Regional Operational Program. Among these 70 were supported through the ROP for developing their infrastructure, and the remaining have not submitted projects that were accepted for financing during the 2007 – 2013 period.

Table no. 3 Evolution of the index for the urban centers

The group of 70 cities supported through ROP	average	min	max
	0.4%	-14.2%	27.6%
The group of 114 cities not supported through ROP	average	min	max
	0.2%	-12.9%	16.2%

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The average (computed as a simple arithmetic mean of the individual relative changes) relative increase of the index, for the 2009-2018 period is double for the group of cities supported through ROP. The highest increase of 27.6% is recorded by the city Pecica, while the largest decrease of 14.2% is recorded by Vaslui. Among the cities that have not received support the highest increase is recorded by Bolintin Vale, while, the highest decrease is recorded by Rovinari.

Finally, the last group includes all other urban areas, with less than 10 000 inhabitants, which were not eligible for infrastructure projects under the Regional Operational Program.

Table no. 4 Evolution of the index for the urban areas with a population under 10 000 inhabitants

Cities with under 10 000 inhabitants in 2007, not eligible for ROP	average	min	max
	5.2%	-23.5%	43.8%

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These cities have recorded an average increase of over five percent, with the largest decreases of over 23% recorded by Ulmeni, and with the largest increase of 43.8%, recorded by Racari.

Conclusions

The proposed index for assessing the urban development incorporates four dimensions, replacing the health dimension of the human development index with a longevity dimension and adds a new dimension measuring the development of the infrastructure. Each dimension includes individual indicators available on the Tempo database of the National Institute of Statistics. For replicability purposes the approach proposed is not data driven and assigns a-priori decided weights to the indicators considering all individual indicators in a dimension equally important. The initial 3 dimensions have a 0.2 weight while the infrastructure dimension is twice as important having a 0.4 importance.

Among the largest eight cities, namely the concentration poles and the capital city, only Cluj-Napoca and Bucharest record an ascending evolution, having therefore better development level than they had at the beginning of the period.

Among the thirteen urban development poles Baia Mare and Satu Mare record the highest increase while Pitesti records the highest decrease in development level.

The average increase of the index among the urban centers supported through ROP is 0.4% while the average increase among those with no projects financed through ROP is only 0.2%.

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