

ECONOMIC DEVELOPMENT PROFILES AT LOCAL LEVEL IN ROMANIA USING SMART MAP SEARCH TOOL FROM BUSINESS ANALYST ONLINE OFFERED IN IN ARC GIS ONLINE/ ESRI¹

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Abstract

Using Smart Map Search from Business Analyst Online (BAO) offered in ESRI platform we present some socio-economic profiles useful to characterise some development profiles at local level in Romania in 2013. The profiles result from multi-criteria selection exploration including Total Population, Registered Unemployed Population, Purchasing Power per capita, the total number of household and average household size. The economic development profiles at LAU2 / NUTS 5 level are described by demographic (total population by age and gender), social (households, unemployment), and economic (purchasing power as well as the consumption profile: Apparel and Services, Household Furnishings, Maintenance & Equipment, Health, Entertainment & Recreation, Food and Tobacco, Electronics & Personal effects) characteristics. The resulted profiles could provide valuable inputs for the sustainability of business as well as for policy makers' decision process if the data will be reliable.

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I. Introduction

Economic development could be characterised in a Geography framework shaped by the spatial, interactional and sustainable development paradigm. The recent informational explosion fully exploited and accelerated by GIS, allow the reality investigation using cartographic methods both in space and real time.

Mândruț (2013, p.58) points as specific: for spatial paradigm the „space is a geographic product built by men”; for the interactional paradigm is focused on the integrated understanding of multiple phenomena (geosystems, landscapes, regions, territories) in interaction with human society and its habitat; sustainable development paradigm spring from social practice (1980) and becomes consecrated since 1987 by Brundtland Report. It considers qualitative temporal perspective for natural resources, gathering a large number of natural and socio-economic parameters. Mândruț (2013, p.53). The already well-known objective of "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" requests the balance between economic development, environment protection, and social equity.

Our approach is calibrated to identify target groups in a more precise and efficient manner as input for the public policies analysis, assessment, impact ...etc.

The novelty of this approach for Romania is the large spectrum of variables used. Next to quantitative indicators regarding labour market characterisation like unemployment, human resource and (partially) salaried persons we integrate also some social dimension like the households and not in the last the disposable income data. The last variable is strongly connected with the quality of life considering „that income is actually an intermediate product of economic activity and welfare is the final product. After all, income is an input into the generation of welfare.” (Komlos 2016,p.9) Finally, we could identify local predictors and target more effectively the public policies and of course to use resources in a smart manner.

II. Research Question

Our research question is regarding: What will be the extreme development profiles at a local level in Romania in 2013 in terms of Higher and Lowest performance characteristics? The novelty of this approach is based on ESRI GIS cartographic methods in BAO using Smart Map Search tool. The profiles result from multi-criteria selection exploration including Total Population, Registered Unemployed Population, Purchasing Power per capita, the total number of household and average household size. The economic development profile is covered (still partially) but in a rich sets of

indicators provided by ESRI MBR data source, covering the following subdimensions: demographic (total population by age and gender), social (households, unemployment), and economic (purchasing power as well as the consumption profile: Apparel and Services, Household Furnishings, Maintenance & Equipment, Health, Entertainment & Recreation, Food and Tobacco, Electronics & Personal effects) characteristics. The profile is complementary enriched with some other indicators provided by TEMPO –INS (national statistics) regarding the administrative characteristics.

III. Models, Variables and data

Model and technique used

Since 2006 Romania is included in Mosaic (the global network of 25 countries and more than one billion consumers worldwide) developed by Geostrategies in partnership with Experian. Mosaic Romania provides a geo-demographic segmentation that classifies „customers into 45 neighbourhood types aggregate into 10 groups”. This methodology applies the principle that „when people are deciding where to live, they naturally prefer to live amongst people with similar demographics, lifestyles and aspirations to their own”. (Experian, 2006)

In view to sharply identify the target market for some public policies we can asses better their needs considering that „government helps people to meet needs. As with the prosperity goal, the expectation is not that government has the main responsibility in all areas, but it takes a leading role in some, such as educating citizens.” (Cochran et. al. 2009, p.4) Also could be used in strategical economic deveolpment for the large cities as Mattoon et.al. (2014) states, looking to „reproting the industry and employment concentrations of each city (in 2012) and how they compare to the nation as a whole”.

Peters et al. (2015, Week 2 : Business Analyst Online) state that „understanding the demographics, lifestyles, and spending habits of customers are critical when making decisions about new products, changing your product mix or deciding on a new business location. Esri® Business Analyst OnlineSM (BAOSM) provides the tools and data necessary so you can perform accurate and detailed market analyses. BAO includes data and reports for more than 135 countries” Also, Esri's location analytics platform includes next to Business Analyst Online the ArcGIS Online.

In view to increasing understanding and improve decision-making in public policies in a holistic manner, we apply instruments of market planning. The Highest and Lowest locations (Peters et al. 2015, Week 2 –Understanding Market Opportunity Exercise) are identified by the following steps:

- „Step 1: Log into Business Analyst Online
- Step 2: Create a new map
- Step 3: Visualize nearby regions
- Step 4: Start a Smart Map Search (technique)
- Step 5: Add data variables

Step 6: Filter search results

Step 8: Share your map (is not available – the count is temporary for BAO)

Step 9: Create a comparison report” (the results are presented in the following paragraph III.)

We select through Smart Map Search, fixing the municipality as the geography level of selection, the following data variables: Total Population (2013), Unemployed persons (2012), Average Household Size (2013), Total number of households (2013), Purchasing Power per capita (2013). We simulate different combinations for the range variation of the mentioned variables. The result of the first adjustment of the slider was narrowed to the first target location with the highest propensity for economic development criteria – Highest location map & list (Table 1). The Step 4 repeated the same procedure and the result was the Lowest location map & list. (Peters et al. 2015, Week 2 : Location-Analytics-for-Retail)

Table 1

Ranges for the selection variables for the Highest and Lowest locations identification

ESRI data Browser for Romania <i>Geography level of selection</i>	Range: first selection Highest locations		Range: second selection Lowest locations	
	Minimum	Maximum	Minimum	Minimum
	<i>Municipality</i>		<i>Municipality</i>	
Total Population (2013),	67451	1871975	118	1871975
Unemployed persons (2012)	4	26723	4	1926
Average Household Size (2013)	1.6	4.4	2.7	5.2
Total number of households (2013)	56	774370	56	774370
Purchasing Power per capita (2013)	19042.82	27310.45	7832.47	9514.02

Source: selection chosen by authors after some maps simulations in Smart Map Search

Variables and data

Romania is included in standard Demographics offered by ESRI Source in MB-Research International Data provided by Michael Bauer Research GmbH (Nuremberg, Germany, August 2015). MBR provides „internationally comparable geographical levels, and to be able to use it in Geographical Information Systems, data are compiled on administrative, postcode and micro levels compatible to existing available boundaries” (ESRI 2015, Demographic Data Release Notes: Romania).

Selection variables – factor variables²

Municipality feature counts 3181 - Geography level of selection, equivalent to LAU2 / NUTS 5 level

Total Population (2013), MBR, U.m. = [number of persons]

Unemployed persons (2012), MBR, U.m. = [number of persons]

Average Household Size (2013), MBR, U.m. = [number of persons/ household]

Total number of households (2013), MBR, U.m. = [number of households]

Purchasing Power (2013), MBR, U.m. = [RON/capita]

² http://downloads.esri.com/esri_content_doc/dbl/int/mb-research_notes.pdf

describes the **disposable income** (income without taxes and social security contributions, including received transfer payments) and is shown in the country's currency (Esri)

Attribute data - Profiling of the selected locations economic development profiles at LAU2 / NUTS 5 level having Source ESRI, MBR³ (downloaded on April 15, 2016)

Demographic variables, MBR, [number of persons]:

- Total population and gender (2013)
- Population by Age (2013), Categories: 0-14; 15-29; 30-44; 45-59; 60+ [years old]
- Male Pop. by Age (2013), Categories: 0-14; 15-29; 30-44; 45-59; 60+ [years old]
- Female Pop. by Age (2013), Categories: 0-14; 15-29; 30-44; 45-59; 60+ [years old]

Social variables, MBR:

- Households (2013),
Total households [number of households]
Average Household Size [number of persons/ household]
- Unemployment (2012), [number of persons]

Economic variables (MBR)

- **Purchasing Power**
- **Consumer Spending** data by categories:

Next to attribute data provided by ESRI – MBR we added some extra information from national statistic sources TEMPO INS:

Demographic data provided by ESRI Romania from 2011 Census

- „Total population 2011”, from 2011 Census
- „Total population in active age 15-64 years 2011” from 2011 Census

Social-economical indicators from TEMPO INS at localities level

FOM104D - Average number of (**salaried**) employees by counties and localities, (2011 and 2012) [number of persons]

SOM101E – **Registered unemployed** persons at the end of the month, by sex, at LAU2 level, (2012 and 2013) [number of persons]

II. Results and discussions

Following the selection there were resulted 24 LAU2 units for Higher locations and 19 LAU 2 units for Lowest locations (Annex1, Figure 1).

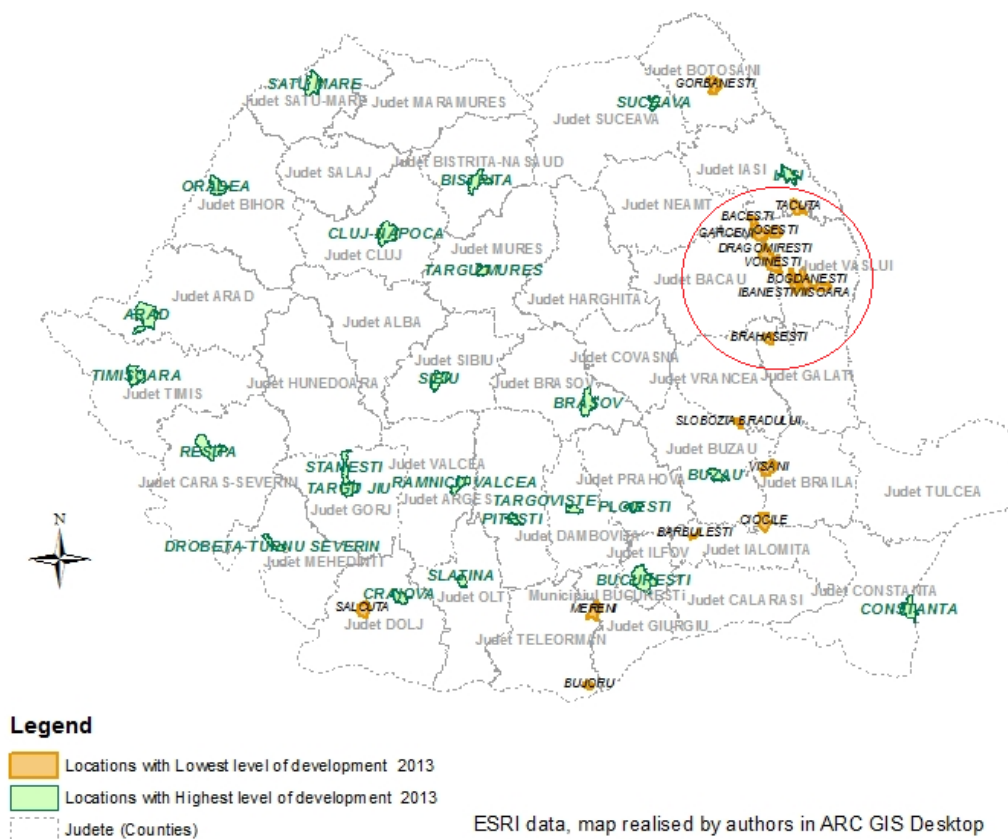
The administrative profile

³ http://downloads.esri.com/esri_content_doc/dbl/int/Romania_MBR_2014.pdf

The administrative profile of Higher location is mainly „Resedinta de Judet” / „County Headquarter” for 22 LAU2, one is the capital (Municipiu) and only one is a Comune. Accordingly there are only 22 counties from the 42 County with its Headquarter selected and Gorj county is the only one county with 2 location selected (Targu Jiu and Stanesti). Also, 23 locations are urban areas and only one is from rural area (Stanesti from Gorj county).

Figure 1

Locations with Lowest and Highest level of development identified with Smarth Map Tool from ESRI



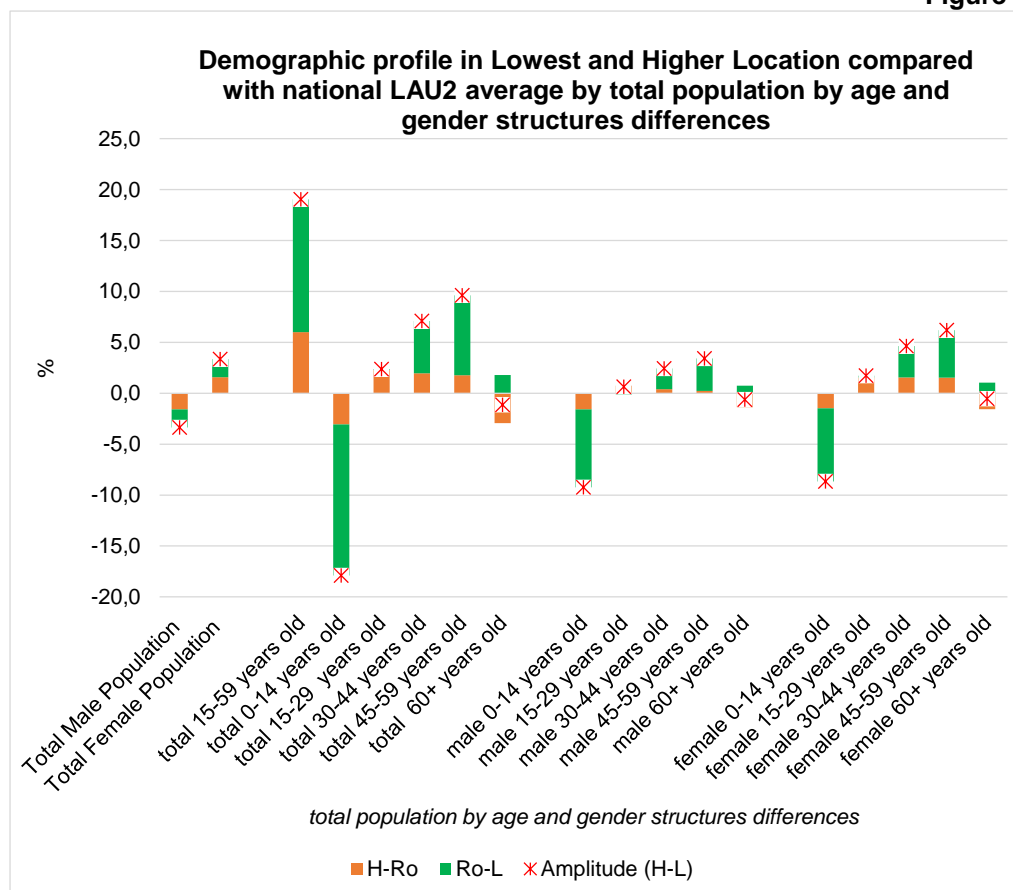
The administrative profile of Lowest location is „Commune” for all 19 LAU2 and all are from the rural area. The spatial distribution of Lowest location is more concentrated in only 8 counties from 42 total, in Vaslui county, there are selected 10 LAU2, Teleorman and Braila for each 2 of LAU2 and in all other 5 countries for each one location is selected. (Figure 1 and Annex 1).

We mention that Dolj county is the only one count in which there are selected one Higher location (Craiova) and one Lowest location (Salcuta).

The demographic profile

The demographic profile differences between Higher and Lowest Locations is illustrated in Figure 2. In Higher locations, there are agglomerations of the population in working age the difference in structure is 19.1pp (difference among the shares of working age population in total population) higher than in Lowest locations. In Lowest locations there agglomerations of children population aged 0-14 years old with 17.9pp

Figure 2



Source: Figure realised by authors with data from ESRI MBR

higher than in Higher locations. Inside the working age population, the highest unbalance is visible for 30-44 and 45-59 age groups. In Higher locations, the female

presence is higher with 10.8 pp than in Lowest locations (4.6pp for female in 30-44 years old age group and 6.2 pp for female in 45-59 years old age group). Looking further to the data becomes obvious that in Lowest locations are a deficit of both women and men in the highest active age groups mentioned before, but more accentuated for women in the report to national structure average. In Lowest locations there are less in the report to a national average for female: with 4.7pp in 45-59 years old age group and 3.1pp in 30-44 years old age group and for male: with 3.2pp in 45-59 years old age group and 2pp in 30-44 years old age group. This important structural unbalances by age and gender in Lowest locations could be explained by the mobility for work, with the model of adults mainly women / mothers or both parents are going abroad for work leaving their children at home with older. On the other side, the demographic model in Higher locations reflects active age population agglomerations with a tendency of the metropolitan type: working age population (15-59 years old) is with 6 pp higher than the national average and the aged population is Lowest with 2.9pp than the same national average for this structure level.

The social profile

Average household size (the ratio of total population to total households) indicates that in Lowest locations are 3.2 persons/household higher than the national average of 2.7 persons /household and higher than the Higher location average of only 2.5 persons/household. (Figure 3)

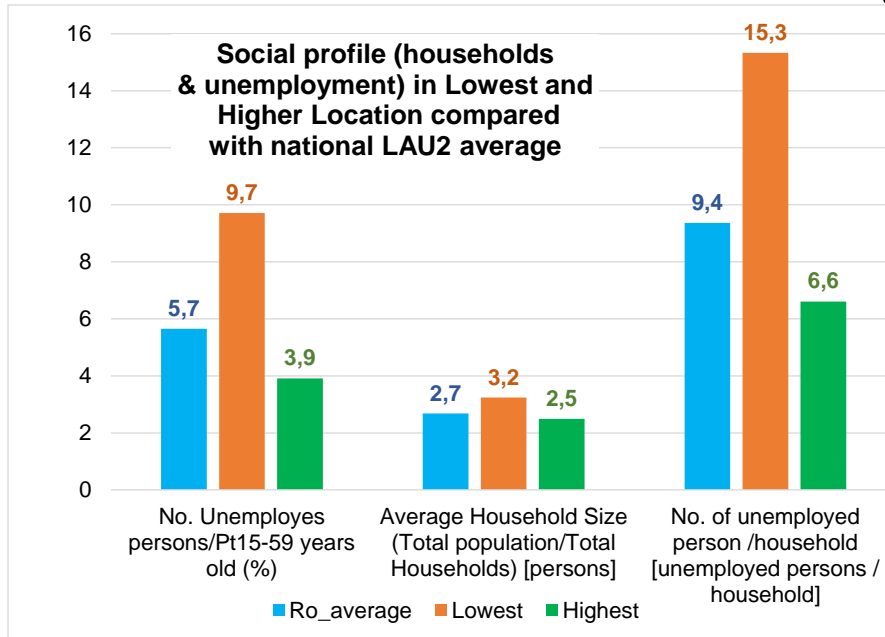
The unemployment rate calculated as the ratio of unemployed persons to active population is more than double in Lowest locations compared to Higher locations. In Lowest locations is 9.7% , higher with 4pp than national (calculate) rate and higher with 5.8pp than the level registered in Higher locations. (Figure 3) In Annex 2 is visible that the administrative calculated unemployment rate is highly inhomogeneous. The unemployment rate at LAU2 level was 7.5% in national LAU2 average, 3.5% in Higher locations and 24% in lower locations. We observe some inconsistencies between results by data source but the tendencies are confirmed. In Lowest location, the administrative unemployment rate is almost 2.5 higher than the national average for rural LAU2 and in Higher locations this indicator is lower with 1.6pp than the than national average for urban LAU2.

Th intensity o unemployment per household is also more than double in Lowest locations compared to Higher locations. In Lowest locations, there is 15.3 unemployed persons / household, higher with almost 6unmeployesd persons / household as the national average and higher with 8.7 unemployed persons / household the level registered in Higher locations. (Figure 3)

Dependency ratios are higher in Lowest locations in both dimensions for aged persons and for children (1.3 dependent persons / household, 1 dependent person aged 0-14 years old / household and 1.3 dependent person aged 60+ years old / household) than in Higher locations (1 dependent persons / household, 0.3 dependent person aged 0-14 years old / household and 1 dependent person aged 60+ years old / household). In short the household structure is unbalanced from the optimum in both locations: Lowest locations the household structure contains more than one aged

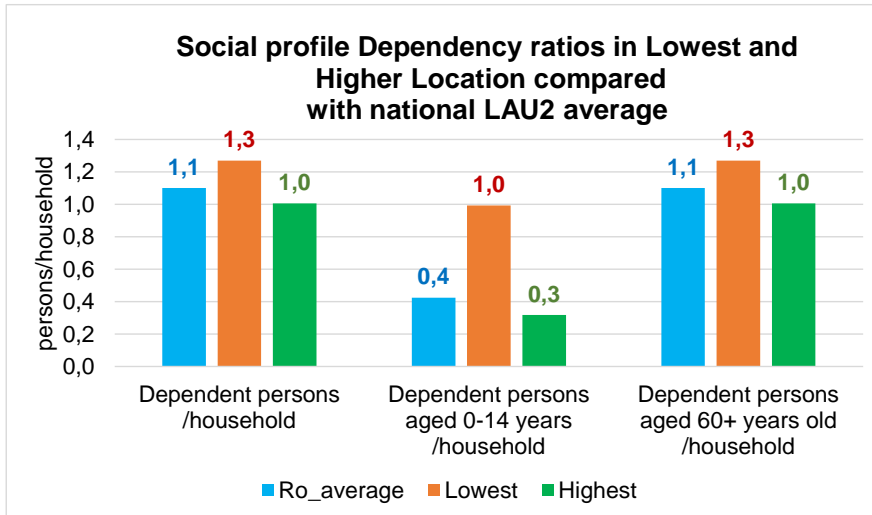
person and at least one child while the Higher location the household structure contains at least one aged person. (Figure 4)

Figure 3



Source: Figure realised by authors with data from ESRI MBR

Figure 4



Source: Figure realised by authors with data from ESRI MBR

The economic profile

The number of salaried persons in 2012 (INS –TEMPO) to total population in active age group (15-64 years old) census data 2011 indicates 116% in Highest locations almost double than the national average at LAU2 level of 64.8% and 10 times higher than the rate registered in Lowest locations of only 10.5%. (Annex2) The Lowest locations rate as a rural location is lower with 5pp than the national rural LAU2 rate of 23.1%. The Higher location salaried person to active population is 17.6pp higher than the national urban LAU2 rate.

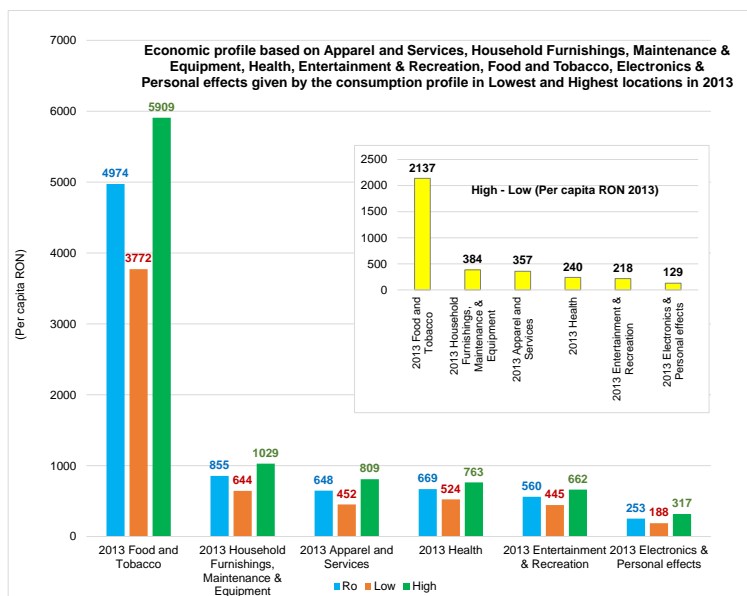
The outlier case of Stanesti (rural area) presents a salaried person to active population rate of 14.9% higher than the Lower rate but below the national average rural rate at the LAU2 level of 23.1%. This location presents a good performance in terms of the unemployment rate for 2013 of approx. 4.3% lower than a national average rural rate at a LAU2 level of 6.9% but still higher than the national average urban rate at a LAU2 level of 3.7%. (Annex 2)

Purchasing Power (2013), MBR reflects the *disposable income* (income without taxes and social security contributions, including received transfer payments) is 9096.53 RON per capita in Lowest locations, lower than the 16752,19 RON per capita in national average LAU2 and much lower than 22652 RON per capita in Highest locations. In report with national average PP in Lower, locations cover only 54% while Higher locations are 135%.(Figure 6)

Consumer Spending data by categories profile is presented in Figure 5. The highest difference in profile is explained by food and tobacco categories in an amount of 2137 higher in Higher Locations comparing to Lowest locations. RON. For all other 5 categories, this distance is reduced to a range between 384 Ron to 129 RON.

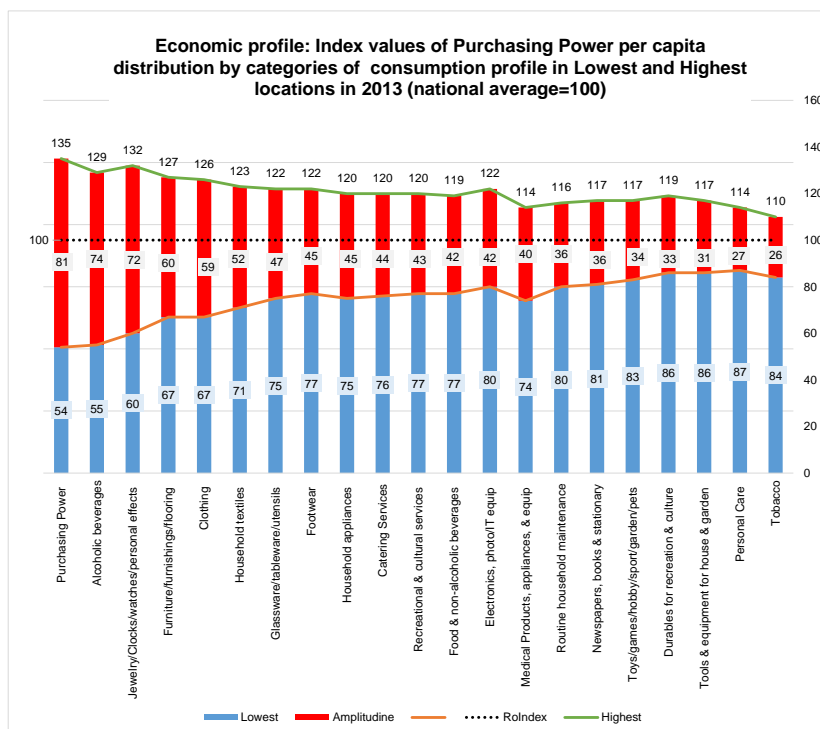
Consumer spending data by products profile is presented in Figure 6. In Lowest locations is spent from national average 55% for Alcoholic beverages at a distance of 74pp to Highest Locations, 60% Jewelry/Clocks/watches/personal effects at a distance of 72pp to Highest Locations, 67% Furniture /furnishings /flooring at a distance of 60pp to Highest Locations, etc. On the other side of the consumer spending profile, the lowest distance between Lowest and Higher profile is registered to Tobacco with 26pp, followed by the personal care at a distance of 27pp, Tools & equipment for house & garden of 31pp, Durables for recreation & culture of 33pp, etc.

Figure 5



Source: Figure realised by authors with data from ESRI MBR

Figure 6



Source: Figure realised by authors with data from ESRI MBR

III. Conclusions

The profile is not complete – does not cover the environment perspective but is in trend with the geodemographic approach. In Romania, there is a rich literature regarding the sustainable development provided from the geographical perspective. There is large literature from Romanian Geography School that links sustainable development with geography: „Ianoş, I., 1995; Bălţeanu, D., 2002; Ungureanu, Al., Groza, O., Muntele, I. –coord., 2002; Bălţeanu, D., Şerban, Mihaela, 2005; Institutul de Geografie, 2005; Simpozioanele de la Zalău, 2008, Cluj – Napoca, 2010 etc.” cited by Mândruţ (2013, p.58).

- **Novelty** - covers disposable income seen as „income is an input into the generation of welfare” (Komlos 2016,p.9) next to other socio-economic indicators. It presents the potential to create public policy market segmentation for better targeting in Romania too;
- **Best towns** and **Lowest communes** or the highest developed urban areas against the lowest developed rural areas – illustrates the highest contrast among the two Romania’s the urban one and the rural – a sketch with rough touches – ameasure of disprity.
- **The best towns** attract resource – mainly human resources – as are the working age persons especially for work and not for leaving (domicile / dwelling). The higher rates of salaried persons to the active population with domicile in the location indicate the presence of periurban areas around these locations.This finding could be better exploited further in future analysis folowing the model proposed by Mattoon et al (2014).

IV. Acknowledgments

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Annex 1

The list of Highest and lowest location selected by Smart Map tool and their administrative rank and their appurtenance to residence area and county

	LAU2 name	judet /County	Administrative Rank	Residence area	Highest Locations	Lowest Locations
1	ARAD	ARAD	Resedinta de judet	urban	1	0
2	PITESTI	ARGES	Resedinta de judet	urban	1	0
3	ORADEA	BIHOR	Resedinta de judet	urban	1	0
4	BISTRITA	BISTRITA-NASAUD	Resedinta de judet	urban	1	0
5	GORBANESTI	BOTOSANI	Comuna	rural	0	1
6	VISANI	BRAILA	Comuna	rural	0	1
7	CIOCILE	BRAILA	Comuna	rural	0	1
8	BRASOV	BRASOV	Resedinta de judet	urban	1	0
9	BUCURESTI	BUCURESTI	Municipiu	urban	1	0
10	BUZAU	BUZAU	Resedinta de judet	urban	1	0
11	RESITA	CARAS-SEVERIN	Resedinta de judet	urban	1	0
12	CLUJ-NAPOCA	CLUJ	Resedinta de judet	urban	1	0
13	CONSTANTA	CONSTANTA	Resedinta de judet	urban	1	0
14	TARGOVISTE	DAMBOVITA	Resedinta de judet	urban	1	0
15	SALCUTA	DOLJ	Comuna	rural	0	1
16	CRAIOVA	DOLJ	Resedinta de judet	urban	1	0
17	BRAHASESTI	GALATI	Comuna	rural	0	1
18	STANESTI	GORJ	Comuna	rural	1	0
19	TARGU JIU	GORJ	Resedinta de judet	urban	1	0
20	BARBULESTI	IALOMITA	Comuna	rural	0	1
21	IASI	IASI	Resedinta de judet	urban	1	0
22	DROBETA-TURNU SEVERIN	MEHEDINTI	Resedinta de judet	urban	1	0
23	TARGU MURES	MURES	Resedinta de judet	urban	1	0

24	SLATINA	OLT	Resedinta de judet	urban	1	0
25	PLOIESTI	PRAHOVA	Resedinta de judet	urban	1	0
26	SATU MARE	SATU-MARE	Resedinta de judet	urban	1	0
27	SIBIU	SIBIU	Resedinta de judet	urban	1	0
28	SUCEAVA	SUCEAVA	Resedinta de judet	urban	1	0
29	MERENI	TELEORMAN	Comuna	rural	0	1
30	BUJORU	TELEORMAN	Comuna	rural	0	1
31	TIMISOARA	TIMIS	Resedinta de judet	urban	1	0
32	RAMNICU VALCEA	VALCEA	Resedinta de judet	urban	1	0
33	TACUTA	VASLUI	Comuna	rural	0	1
34	ALEXANDRU VLAHUTA	VASLUI	Comuna	rural	0	1
35	BACESTI	VASLUI	Comuna	rural	0	1
36	OSESTI	VASLUI	Comuna	rural	0	1
37	GARCENI	VASLUI	Comuna	rural	0	1
38	DRAGOMIRESTI	VASLUI	Comuna	rural	0	1
39	VOINESTI	VASLUI	Comuna	rural	0	1
40	BOGDANESTI	VASLUI	Comuna	rural	0	1
41	VIISOARA	VASLUI	Comuna	rural	0	1
42	IBANESTI	VASLUI	Comuna	rural	0	1
43	SLOBOZIA BRADULUI	VRANCEA	Comuna	rural	0	1
Total /location type					24	19
Total						43

The highest and lowest location supplementary socio-economic characterization given by the ratios of unemployed and salaried persons to total population and active population 15-64 years old, in 2011-2013, from INS TEMPO data source

		Number of salaried persons 2011 / Total population 2011	Number of salaried persons 2012 / Total population 2011	Number of salaried persons 2011 / Total population in active age 15-64 years 2011	Number of salaried persons 2012 / Total population in active age 15-64 years 2011	Number of registered unemployed persons 2012 / Total population 2011	Number of registered unemployed persons 2013 / Total population 2011	Number of registered unemployed persons 2012 / Total population in active age 15-64 years from 2011	Number of registered unemployed persons 2013 from / Total population in active age 15-64 years from 2011
Lowest (19) 19	rural	5,8	5,8	10,5	10,5	11,5	13,3	20,7	24,0
Highest (24) 1	rural	10,4	9,9	15,5	14,9	4,7	4,3	7,0	6,4
Ro (national average) 2867	rural	14,9	15,2	22,6	23,1	6,6	6,9	10,0	10,5
<hr/>									
Highest (24) 23	urban	85,4	87,0	113,7	116,0	2,7	2,6	3,5	3,5
Ro (national average) 314	urban	70,8	72,4	96,3	98,4	3,6	3,7	5,0	5,1
<hr/>									
Lowest (19) 19	Total	5,8	5,8	10,5	10,5	11,5	13,3	20,7	24,0
Highest (24) 24	Total	85,3	87,0	113,7	115,9	2,7	2,6	3,5	3,5
Ro (national average) 3189	Total	44,4	45,3	63,5	64,8	5,0	5,2	7,2	7,5

Data sources: „Total population 2011”, „Total population in active age 15-64 years 2011” from 2011 Census
 „Number of salaried persons 2011 and 2012” and „Number of unemployed persons 2012 and 2013” from TEMPO INS.

