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ANALYSIS OF VARIANCE OF INFRASTRUCTURE FOR THE MAIN CATEGORIES OF PUBLIC UTILITIES AT TERRITORIAL LEVEL IN ROMANIA

Abstract. *Development of local public utilities as a factor of regional development determines growth of the quality of life, but when talk in terms of sustainable development, must to consider their correlation with existing resources, protection and conservation of the environment. It is a fact that a significant part of the inhabitants of Romania do not enjoy basic facilities such as electricity supply, water, sewer, natural gas, but, the regional development of Romania cannot be achieved without an suitably accessing of these utilities to all localities. The aim of paper is to analyses if there are developed Romanian regions which have particular public utilities services, but which need controlled actions for a sustainable development, and in the same time, if there are, underdeveloped regions for which the sustainable development principles can provide chances for reducing inter-regional disparities. In this context, was using One Factor Analysis of Variance – ANOVA. So, has been considered that the developed regions are factors of interest for development of local public utilities services and has been tested if the region has a significant effect on the regional differences regarding public utilities services.*

Key words: *regional development, public utilities, analysis of variances*

JEL Classification: C23, D24, L97

1. Introduction

The new global economic aspects of reality inevitably lead to an increased standard of living and quality of life due to permanent lifestyle improvements in our society. Besides the many aspects that contribute to its tendancy, public services will help transform the lifestyle, given the fact that it was demonstrated that the continuous improvement of living standards of the individual and local or regional economic development can not be achieved without the adequate system of public utilities. Today, in conditions of economic instability, due to financial

pressure on public budgets, public services are clamped tight between public spending and increased demand for effective and efficient performance.

The literature appears to delineate the sense of using in economic theory, on the hand the science of commodities and by the other hand the public services, the last one being subject to the study undertaken in this work. In the contemporary economic theory, we find the term useful in terms of giving a product assembly functions use value (utility) of those goods. In the science of goods, we find the value of his property as a subject that is the synthesis of all functions (useful, decorative, personalization, symbolic etc.) of the good and the distinction between useful function or utility itself and use value, respectively broad utility, which is a good synthesis of desirable properties. In the economic sense, the concept of service covers a much smaller area, bounded by the notion of utility (use value). In this sense the services can be defined as "useful activities designed to meet a social need." (J. Nusbaumer 1984, p.4). The specialists define the service as a utility system, the beneficiary buys or uses a product and a certain utility, which gives him certain advantages often rewarding not materialized in most cases, a good material and intended to satisfy some personal need or social. (Andre Tordjman, 1993 p.104). With respect to services in general, it is considered more often need to consider services like a utility system, the beneficiary buys or uses not a product but a certain utility, which offers certain advantages (not materialized in most cases in a good material) designed to meet the needs of personal and social. Public utility system is a combination of elements dependent on each other and forming an organized whole that ...) makes a practical activity to operate aim pursued (Coteanu et al., 1998). "In public services, the term signifies the public service utility, the two concepts are often used interchangeably. However, for more rigor, the utilities define a category of services that often have a material component evident that, by their nature, involve specific infrastructure. Most important commodities are electricity, heat, natural gas, waste management/urban water supply, sewerage, telecommunications, etc." (Ion Plumb, Armenia Androniceanu, Oana Abaluta 2003, p.9). However, all the authors consider that the notion of public service is used to designate a general interest activity, performed by a body that is a legal person authorized by a public authority. "Public utilities must meet certain requirements universality; Continuity both qualitatively and quantitatively, in contractual terms; adaptability to user requirements and long-term management; equal and non-discriminatory accessibility to public service, under the contract, transparency and protection of users." (Vasilica Negri 2008, p. 99)

2. Concept and typology of public utility services

In the literature, the utilities are found and under the name of services of public interest given that according to romanian public administration "public utility", defined as aggregate an utility and general public interest is expandable in communes, towns, cities or counties under the direction and responsibility of local authorities in order to meet the requirements of local communities, which provide

the following utilities like water supply, sewage and wastewater treatment, collection, sewerage and drainage of rainwater; production, transmission, distribution and supply of heat in a centralized system, localities sanitation, public lighting, public and private management of administrative-territorial units, local public transport. Green paper on services of general interest, makes some clarificate of the concept of the "services of general interest" which it defines as those public services that institutions and public authorities contracts to be performed by some economic or social unit, called "supplier" or "operators" of public services; they may be state-owned, private, mixed or community.

Also in accordance with the specifications of this document issued by the European Union in 2003, SGI refers to two categories of public services, namely:

- *Services provided by network industries* (communications, transport, postal services, distribution of electric and thermal energy, gas management, water distribution, sewerage and wastewater treatment, etc.);

- *Social and economic activities of public interest*: public lighting, social housing, public domain management and maintenance, management and maintenance of housing, real estate cadastre and utilities etc.).

Every citizen has access to public services for economic and social interest generally in accordance with the Charter of Fundamental Human Rights, adopted by the European Union, and the quality at which the service is dependent on aspects related to improving the quality of life and increasing economic, social and territorial. National, regional, county and local competent authorities are responsible for defining, organizing, financing and control of public services. In the interest of sound administration, it is necessary that public services should be viewed in a continuous evolution and be adapted to the new requirements of technological, economic and social.

3. Data and Variables. Descriptive Analysis

The territorial studies can highlight the regions with particular needs for controlled actions on sustainable development, but, in the same time, underdeveloped regions and regions where sustainable development principles can provide chances for recovery. The existence of adequate infrastructure is a prerequisite for sustainable development supported. To get a picture of the level of provisioning for the main categories of public utilities took in consideration four indicators that measure people's access to the main categories of utilities, variables that we considered relevat in the study: mains water, sewer systems or network natural gas distribution network and modernized public roads on territorial level by counties and development regions at the end of 2014, data publicly available on the website of the National Institute of Statistics. In seeking to describe the current status of considered variables we based on data for counties of eight development

regions of Romania, with reference to 2014, the last available regional statistics, presented in table below:

Table no. 1 – Romanian technical infrastructure for the main categories of public utilities on territorial level by counties and development regions at the end of year 2014

Devlopment region	County	The total length of the network simple distribution of drinking water, Km	The total length of gas distribution pipelines, Km	Simple total length of sewerage pipes, Km	The total length of public roads upgraded, Km
North – East (Region RO1)	**Bacau**	1718.1	920.5	703.1	890
	Botosani	800.9	262.4	235.7	727
	Iasi	2050.6	993.7	957.5	406
	Neamt	1374.7	510	378.2	547
	Suceava	1321	550.9	926.9	1576
	Vaslui	1059.3	333.7	425.7	777
South – East (Region RO2)	**Braila**	1358.9	449.8	341.2	656
	Buzau	2145.5	575.3	348.1	347
	Constanta	2891.5	968.9	1432.8	740
	Galati	2214.7	640	750.2	385
	Tulcea	1557	151.3	384.9	530
	Vrancea	1576.2	227.5	313.6	636
South– Muntenia (Region RO3)	**Arges**	3512.5	1177	687.3	646
	Calarasi	1221.6	250.6	232.9	634
	Dambovita	1793.4	1517.3	339.6	626
	Giurgiu	458.0	351.1	256.3	766
	Ialomita	1438.8	322.5	228	516
	Prahova	3265.5	2502.5	907.4	577
	Teleorman	1061.9	234.5	321.1	1095
South-West Oltenia (Region RO4)	**Dolj**	1937	664.1	684.2	844
	Gorj	1784.7	907.3	271.5	1015
	Mehedinti	930.7	27.6	291.4	766
	Olt	1696.5	355.1	419.2	702
	Valcea	2138.6	558.7	731.4	812
West (Region RO5)	**Arad**	2650.8	1217.9	909.2	1133
	Caras-Severin	1210.5	484.7	522.8	1008
	Hunedoara	1760.1	854.7	973	938
	Timis	3065.2	1597.4	1081.5	986
North–West (Region RO6)	**Bihor**	2521.9	590.6	1167.1	865
	Bistrita-Nasaud	1212.7	747.9	622.9	447
	Cluj	2899.0	2246.6	1254.8	1098
	Maramures	2042.1	1066.8	545.3	609
	Satu Mare	1536.9	753.5	630.1	462
	Salaj	1212.9	460.9	417.7	354
Center (Region RO7)	**Alba**	1685.1	1373	697.1	1386
	Brasov	2008.8	1598.2	890.7	773
	Covasna	659.6	231.6	424.9	390
	Harghita	1451.4	541.4	827.6	831
	Mures	2099.9	3246.2	1086.4	476
	Sibiu	1439.5	1487.9	997.2	498
Ilfov (Region RO8)	**Ilfov**	899.2	1943	707.0	680
	Bucharest	2600.0	1995.7	2336.0	90

Source: Processed data from http://statistici.insse.ro/shop/index.jsp?page=tempo2&lang=ro&context=75

In accordance with the National Institute of Statistics, the date considered represented:

– *total length of the water distribution* network represents the simple length of tubes and pipes installed in a territory to transport drinking water from the culvert pipes or pumping stations to consumers branching points;

– *total length of pipeline gas distribution* refers to all pipes (network and directly from pipelines transport) which distribute gas to consumers in a village, starting at gas pressure control and gas delivery by suppliers to consumers branching points, regardless of the operating pressure to which they are exploited.

– *total length of the sewerage pipes simply* represents the length of channels (tubes) which collects and discharges wastewater (domestic, industrial, etc.) and those from rainfall within the locality with public sewerage, from homes connection buildings with sewage installations and to the point of discharge of wastewater into a natural emissary. Both include sewerage networks (service) and the main and secondary sewers.

– *length of modernized municipal streets* (km) is the length of shaped stone streets with coatings, asphalt or concrete. Portions shaped stone paved with cobblestone include clothing, parallelepiped or other regular shapes.

The objectives of the analyze aim both the territorial distribution of these variables at the level of the 41 counties of Romania and Bucharest, but also their regional distribution of the 8 regions. It should be noted that the development regions in Romania are constituted by the voluntary association of neighboring counties. They aren't administrative-territorial units and not having legal personality.

Figure 1 – Development Regions of Romania
Source: http://www.mdrt.ro/

Table no. 2 – Romanian technical infrastructure for the main categories of public utilities centralised on development regions at the end of the year 2014

Devlopment region	Number of Counties	The total length of the network simple distribution of drinking water, Km	The total length of gas distribution pipelines, Km	Simple total length of sewerage pipes, Km	The total length of public roads upgraded, Km
North – East (Region RO1)	6	8324.6	3571.2	3627.1	4923
South – East (Region RO2)	6	11743.8	3012.8	3570.8	3294
South – Muntenia (Region RO3)	7	12751.7	6355.5	2972.6	4860
South - West Oltenia (Region RO4)	5	8487.5	2512.8	2397.7	4139
West (Region RO5)	4	8686.6	4154.7	3486.5	4065
North – West (Region RO6)	6	11425.5	5866.3	4637.9	3835
Center (Region RO7)	6	9344.3	8478.3	4923.9	4354
Ilfov (Region RO8)	2	3499.2	3938.7	3043	770
România	**42**	**74263.2**	**37890.3**	**2865.5**	**30240**

Source: The authors calculated

For the descriptive analysis of the data we used software package SPSS statistics v.20. The descriptive analysis using SPSS procedure indicate that for all four indicators there are variation between counties especially for existing total length of the network simple distribution of drinking water and for the total length of gas distribution pipelines as can see in table no. 3. It finds that, there are disparities in terms of the technical infrastructure for accesing public utilities available at the county level, too.

Table no. 3 – Descriptive Statistics for the main categories of public utilities centralised on development regions at the end of the year 2014

	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
The total length of the network simple distribution of drinking water	42	3054.50	458.00	3512.50	74263.20	1768.1714	714.51838	510536.521
The total length of gas distribution pipelines	42	3218.60	27.60	3246.20	37890.30	902.1500	707.45772	500496.429
Simple total length of sewerage pipes	42	2108.00	228.00	2336.00	28659.50	682.3690	410.32709	168368.324
The total length of public roads upgraded	42	1486.00	90.00	1576.00	30240.00	720.0000	289.24890	83664.927
Valid N (listwise)	42							

Source: SPSS Output

It is easy to note that for all four indicators there are significant variation between counties. especially in terms of total length of the network simple distribution of drinking water and in total length of gas distribution pipelines. It finds that there are disparities in terms of the available technical infrastructure at the county level for the public utilities. The results of the procedure for each of four indicators are shown bellow:

Table no. 4 – Descriprive report for total length of the network simple distribution of drinking water centralised on territorial level of the Romanian development regions at the end of the year 2014

Development Region	Mean	N	Std. Deviation	Std. Error of Mean	Minimum	Maximum
Center (RO7)	1557.3833	6	518.75943	211.78265	659.60	2099.90
Ilfov and Bucharest (RO8)	1749.6000	2	1202.64721	850.40000	899.20	2600.00
North – East (RO1)	1387.4333	6	448.41919	183.06637	800.90	2050.60
North–West (RO6)	1904.2500	6	704.43935	287.58616	1212.70	2899.00
South – East (RO2)	1957.3000	6	572.35714	233.66383	1358.90	2891.50
South-West Oltenia (RO4)	1697.5000	5	460.30331	205.85390	930.70	2138.60
South–Muntenia (RO3)	1821.6714	7	1146.57970	433.36639	458.00	3512.50
West (RO5)	2171.6500	4	840.87237	420.43619	1210.50	3065.20
Total	1768.1714	42	714.51838	110.25258	458.00	3512.50

Source: SPSS Output

The data show a significant difference between the counties of region South–Muntenia (RO3). and between Ilfov County and Bucharest (RO8). too. if we discuss the intraregional total length of the network distribution of drinking water. in time what iurgiu County occupy the last place in the country with the lowest network. It is important to note the Region West (RO5) with the highest regional average. with tow important counties.Timiş and Arad.

Table no. 5 – Descriprive report for the total length of gas distribution pipelines centralised on territorial level of the Romanian development regions at the end of the year 2014

Region	Mean	N	Std. Deviation	Std. Error of Mean	Minimum	Maximum
Center (RO7)	1413.0500	6	1054.27926	430.40771	231.60	3246.20
Ilfov (RO8)	1969.3500	2	37.26453	26.35000	1943.00	1995.70
North – East (RO1)	595.2000	6	300.99235	122.87961	262.40	993.70
North–West (RO6)	977.7167	6	653.91870	266.96119	460.90	2246.60
South – East (RO2)	502.1333	6	297.81806	121.58371	151.30	968.90
South-West Oltenia (RO4)	502.5600	5	331.81049	148.39016	27.60	907.30
South–Muntenia (RO3)	907.9286	7	868.40491	328.22621	234.50	2502.50
West (RO5)	1038.6750	4	477.85295	238.92648	484.70	1597.40
Total	902.1500	42	707.45772	109.16310	27.60	3246.20

Source: SPSS Output

Regarding the infrastructure of gas distribution pipelines. the region (RO8) presents the highest regional average. but this is because Bucharest is included. In this region. Romania has a significant difference between Bucharest and Ilfov County. A similar situation is in West (RO5). where the Caras-Severin County is far away relative to Timis. But. the best situation has region Center (RO7). the Mureş County occupying the first rank in the country.

Table no. 6 – Descriprive report for simple total length of sewerage pipes centralised on territorial level of the Romanian development regions at the end of the year 2014

Region	Mean	N	Std. Deviation	Std. Error of Mean	Minimum	Maximum
Center (RO7)	820.6500	6	236.06395	96.37270	424.90	1086.40
Ilfov (RO8)	1521.5000	2	1151.87695	814.50000	707.00	2336.00
North – East (RO1)	604.5167	6	302.47885	123.48648	235.70	957.50
North–West (RO6)	772.9833	6	348.85007	142.41744	417.70	1254.80
South – East (RO2)	595.1333	6	441.51960	180.24962	313.60	1432.80
South-West Oltenia (RO4)	479.5400	5	216.58566	96.86005	271.50	731.40
South–Muntenia (RO3)	424.6571	7	265.75982	100.44777	228.00	907.40
West (RO5)	871.6250	4	243.18386	121.59193	522.80	1081.50
Total	682.3690	42	410.32709	63.31485	228.00	2336.00

Source: SPSS Output

About the situation of sewerage pipes. can note a particularity of Bucharest. that determines the highest regional mean for Region Ilfov (including Bucharest) (RO8) and the highest intraregional standard deviation.

Table no. 7 – Descriprive report for the total length of public roads upgraded centralised on territorial level of the Romanian development regions at the end of the year 2014

Region	Mean	N	Std. Deviation	Std. Error of Mean	Minimum	Maximum
Center (RO7)	725.6667	6	367.75354	150.13475	390.00	1386.00
Ilfov (RO8)	385.0000	2	417.19300	295.00000	90.00	680.00
North – East (RO1)	820.5000	6	408.13172	166.61908	406.00	1576.00
North–West (RO6)	639.1667	6	287.08007	117.19995	354.00	1098.00
South – East (RO2)	549.0000	6	157.20051	64.17684	347.00	740.00
South-West Oltenia (RO4)	827.8000	5	117.47425	52.53608	702.00	1015.00
South–Muntenia (RO3)	694.2857	7	192.30420	72.68416	516.00	1095.00
West (RO5)	1016.2500	4	83.13994	41.56997	938.00	1133.00
Total	720.0000	42	289.24890	44.63207	90.00	1576.00

For public roads upgraded. region West (RO5) has the most important regional total length. while region North – East (RO1) has the county with the highest length in kilometers. Suceava. On the other hand. the County Ilfov occupies the last place in the country similar with region South – East (RO2).

4. Methodology and Results

Has been considered that the developed region is factor of interest for development of local public utilities services and has been tested if the region has a significant effect on the regional differences regarding public utilities services. The method that we used for analyzing is one factor analysis of variance, which is a special case of analysis of variance (ANOVA) for one factor of interest. We will consider that the level of these variables varies between the eight regions. if we will notice the presence of some significant statistical differences between the means of their values. For studying homogeneity of variance for each of the four considered variables. in a first step we used Levene test and Tamhane statistical

test for multiple comparation to determine the presence of significant differences between the mean values of variables in each region compared with all the others in case that Levene test statistical significance indicate that variance is not homogeneous and Bonferroni statistical test on the otherwise. Using ANOVA for guiding in saying with a level of confidence that a certain factor or factors were the more likely reason for the chance of natural variation of a phenomenon. can evaluate differences between data sets. Also, with SPSS ANOVA procedure we can also compare regional means and test the null hypothesis that all the regional means of the considered technical infrastructure for public utilities indicators are equal.

4.1. The influence of the development region on simple total length of sewerage pipes

After applying the Levene test using SPSS. presented in table no. 8. we obtained a significance level Sig.<0.05. for the variable *Simple total length of sewerage pipes* showing that the variances of the 8 statistical subpopulations. corresponding to the regions. are not homogeneous.

Table no. 8. - Test of Homogeneity of Variances
Simple total length of sewerage pipes

Levene Statistic	df1	df2	Sig.
4.962	7	34	.001

Source: SPSS Output

These average values of regional level of *Simple total length of sewerage pipes*. in km. are presented in the following figure:

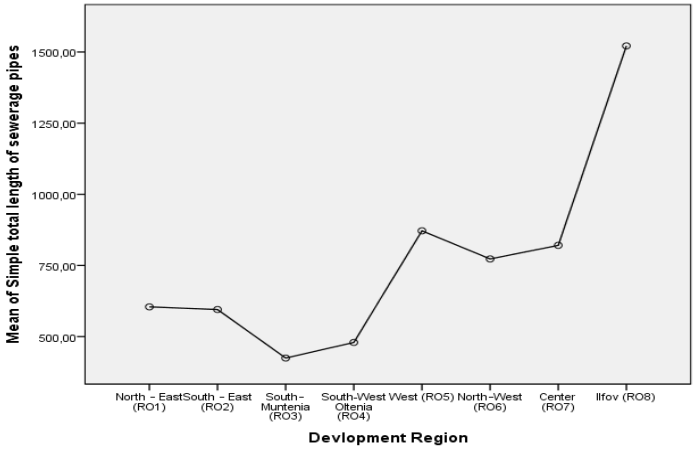

Figure 2 – Mean of simple total length of sewerage pipes at the regional level
Source: **SPSS Output**

Using the Levene test with SPSS we obtain a significance level of Sig. = 0.001, so in this situation does not allow us to use the ANOVA procedure. Even if in the figure above we can see that the average value of the simple total length of sewerage pipes at the Ilfov (including Bucharest) region is larger then those corresponding to others regions, by using the Tamhane test with SPSS we can see that there are not statistically significant differences. Applying Tamhane test with SPSS. the following differences are obtained between the use *Simple total length of sewerage pipes* in the regions on the first column minus the one from the regions form the second column. The output of the procedure are presented in the table below:

Table no. 9 – The level of significance of Tamhane Test for Multiple Comparisons for dependent Variable: Simple total length of sewerage pipes

	North – East (RO1)	South – East (RO2)	South–Muntenia (RO3)	South-West Oltenia (RO4)	West (RO5)	North–West (RO6)	Center (RO7)	Ilfov (RO8)
North – East (RO1)		1.000	1.000	1.000	0.993	1.000	0.998	1.000
South – East (RO2)	1.000		1.000	1.000	1.000	1.000	1.000	1.000
South–Muntenia (RO3)	1.000	1.000		1.000	0.518	0.890	0.363	1.000
South-West Oltenia (RO4)	1.000	1.000	1.000		0.718	0.976	0.625	1.000
West (RO5)	0.993	1.000	0.518	0.718		1.000	1.000	1.000
North–West (RO6)	1.000	1.000	0.890	0.976	1.000		1.000	1.000
Center (RO7)	0.998	1.000	0.363	0.625	1.000	1.000		1.000
Ilfov (RO8)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	

*The difference is considered to be significant if the significance level is < 0.05.

Based on the above table, can note that regarding simple total length of sewerage pipes there are not statistically significant differences between any Romanian development regions.

4.2. The influence of the development region on total length of the network simple distribution of drinking water

Using SPSS procedure for the Levene test. we obtained a significance level Sig.≥0.05. for the variable *The total length of the network simple distribution of drinking water* showing that the variances of the 8 statistical regions are homogeneous.

Table no. 10 - Test of Homogeneity of Variances

The total length of the network simple distribution of drinking water

Levene Statistic	df1	df2	Sig.
2.042	7	34	.078

Source: SPSS Output

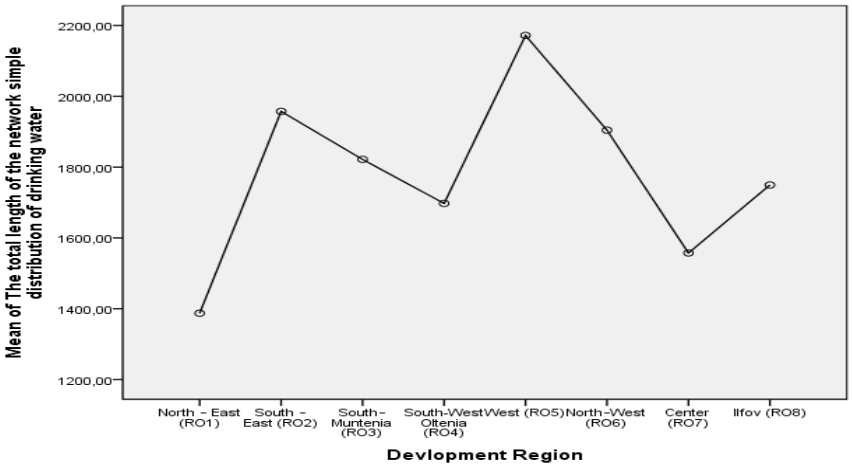

Figure 3 – Mean of total length of the network simple distribution of drinking water at the regional level
Source: **SPSS Output**

The graph before shows averages of the total length of the network simple distribution of drinking water at the regional level.

Consequently, because we obtained a significance level of Sig. = 0.078, we may apply the ANOVA procedure, in order to determine the presence of significant differences between groups corresponding to development regions and with the Bonferroni test that compare every region to the others.

Table no. 11 – ANOVA

The total length of the network simple distribution of drinking water

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2158958.305	7	308422.615	.559	.784
Within Groups	18773039.061	34	552148.208		
Total	20931997.366	41			

Source: SPSS Output

The Fisher coefficient with 7 and 34 degrees of freedom is F = 0.559 and the significance level is Sig. = 0.784 > 0.05, proving that there are not significant differences between regions on the level of length of the network simple distribution of drinking water. Finally, because the value of Levene test indicate that regions are homogeneous we used Bonferroni Test. The results of the multiple mean comparrisons are in the table no.12.

By using the Bonferroni test procedure we can see that the value of length of the network simple distribution of drinking water in West region is significantly larger then the values corresponding to North-East region and the Center region. Compeering the West region to those other development regions we can easily see that its value is always larger, but the difference is not statistically significant.

Table no. 12 – Multiple Comparisons for dependent Variable: The total length of the network simple distribution of drinking water (km). The level of significance of Bonferroni Test

(I) Region	(J) Region	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
North – East (RO1)	South – East (RO2)	-569.86667	429.00979	1.000	-2024.0928	884.3595
	South–Muntenia (RO3)	-434.23810	413.40418	1.000	-1835.5655	967.0893
	South-West Oltenia (RO4)	-310.06667	449.94927	1.000	-1835.2719	1215.1386
	West (RO5)	-784.21667	479.64753	1.000	-2410.0909	841.6576
	North–West (RO6)	-516.81667	429.00979	1.000	-1971.0428	937.4095
	Center (RO7)	-169.95000	429.00979	1.000	-1624.1761	1284.2761
	Ilfov (RO8)	-362.16667	606.71147	1.000	-2418.7530	1694.4197
South – East (RO2)	North – East (RO1)	569.86667	429.00979	1.000	-884.3595	2024.0928
	South–Muntenia (RO3)	135.62857	413.40418	1.000	-1265.6988	1536.9560
	South-West Oltenia (RO4)	259.80000	449.94927	1.000	-1265.4053	1785.0053
	West (RO5)	-214.35000	479.64753	1.000	-1840.2243	1411.5243
	North–West (RO6)	53.05000	429.00979	1.000	-1401.1761	1507.2761
	Center (RO7)	399.91667	429.00979	1.000	-1054.3095	1854.1428
	Ilfov (RO8)	207.70000	606.71147	1.000	-1848.8863	2264.2863
South–Muntenia (RO3)	North – East (RO1)	434.23810	413.40418	1.000	-967.0893	1835.5655
	South – East (RO2)	-135.62857	413.40418	1.000	-1536.9560	1265.6988
	South-West Oltenia (RO4)	124.17143	435.09534	1.000	-1350.6831	1599.0259
	West (RO5)	-349.97857	465.74174	1.000	-1928.7160	1228.7589
	North–West (RO6)	-82.57857	413.40418	1.000	-1483.9060	1318.7488
	Center (RO7)	264.28810	413.40418	1.000	-1137.0393	1665.6155
	Ilfov (RO8)	72.07143	595.77883	1.000	-1947.4563	2091.5991
South-West Oltenia (RO4)	North – East (RO1)	310.06667	449.94927	1.000	-1215.1386	1835.2719
	South – East (RO2)	-259.80000	449.94927	1.000	-1785.0053	1265.4053
	South–Muntenia (RO3)	-124.17143	435.09534	1.000	-1599.0259	1350.6831
	West (RO5)	-474.15000	498.46434	1.000	-2163.8081	1215.5081
	North–West (RO6)	-206.75000	449.94927	1.000	-1731.9553	1318.4553
	Center (RO7)	140.11667	449.94927	1.000	-1385.0886	1665.3219
	Ilfov (RO8)	-52.10000	621.69425	1.000	-2159.4739	2055.2739
West (RO5)	North – East (RO1)	784.21667	479.64753	1.000	-841.6576	2410.0909
	South – East (RO2)	214.35000	479.64753	1.000	-1411.5243	1840.2243
	South–Muntenia (RO3)	349.97857	465.74174	1.000	-1228.7589	1928.7160
	South-West Oltenia (RO4)	474.15000	498.46434	1.000	-1215.5081	2163.8081
	North–West (RO6)	267.40000	479.64753	1.000	-1358.4743	1893.2743
	Center (RO7)	614.26667	479.64753	1.000	-1011.6076	2240.1409
	Ilfov (RO8)	422.05000	643.51469	1.000	-1759.2892	2603.3892
North–West (RO6)	North – East (RO1)	516.81667	429.00979	1.000	-937.4095	1971.0428
	South – East (RO2)	-53.05000	429.00979	1.000	-1507.2761	1401.1761
	South–Muntenia (RO3)	82.57857	413.40418	1.000	-1318.7488	1483.9060
	South-West Oltenia (RO4)	206.75000	449.94927	1.000	-1318.4553	1731.9553
	West (RO5)	-267.40000	479.64753	1.000	-1893.2743	1358.4743
	Center (RO7)	346.86667	429.00979	1.000	-1107.3595	1801.0928
	Ilfov (RO8)	154.65000	606.71147	1.000	-1901.9363	2211.2363
Center (RO7)	North – East (RO1)	169.95000	429.00979	1.000	-1284.2761	1624.1761
	South – East (RO2)	-399.91667	429.00979	1.000	-1854.1428	1054.3095
	South–Muntenia (RO3)	-264.28810	413.40418	1.000	-1665.6155	1137.0393
	South-West Oltenia (RO4)	-140.11667	449.94927	1.000	-1665.3219	1385.0886
	West (RO5)	-614.26667	479.64753	1.000	-2240.1409	1011.6076
	North–West (RO6)	-346.86667	429.00979	1.000	-1801.0928	1107.3595
	Ilfov (RO8)	-192.21667	606.71147	1.000	-2248.8030	1864.3697
Ilfov (RO8)	North – East (RO1)	362.16667	606.71147	1.000	-1694.4197	2418.7530

(I) Region	(J) Region	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
	South – East (RO2)	-207.70000	606.71147	1.000	-2264.2863	1848.8863
	South–Muntenia (RO3)	-72.07143	595.77883	1.000	-2091.5991	1947.4563
	South-West Oltenia (RO4)	52.10000	621.69425	1.000	-2055.2739	2159.4739
	West (RO5)	-422.05000	643.51469	1.000	-2603.3892	1759.2892
	North–West (RO6)	-154.65000	606.71147	1.000	-2211.2363	1901.9363
	Center (RO7)	192.21667	606.71147	1.000	-1864.3697	2248.8030

Source: SPSS Output

The Bonferroni test confim that there are not significant differences in the means of indicate variable, as long as all the confidence intervals does contain 0 value.

4.3. The influence of the development region on the total length of gas distribution pipelines

The significance level of Levene test for the variable the total length of gas distribution pipelines is higher then 0.05. so it shows that the variances of the 8 statistical regions are homogeneous. Applying the ANOVA procedure, in order to determine the presence of significant differences between groups corresponding to development regions and with the Bonferroni test that compare every region to the others we have:

Table no. 13 - ANOVA

The total length of the network simple distribution of drinking water

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6276747.170	7	896678.167	2.140	.066
Within Groups	14243606.415	34	418929.600		
Total	20520353.585	41			

Source: SPSS Output

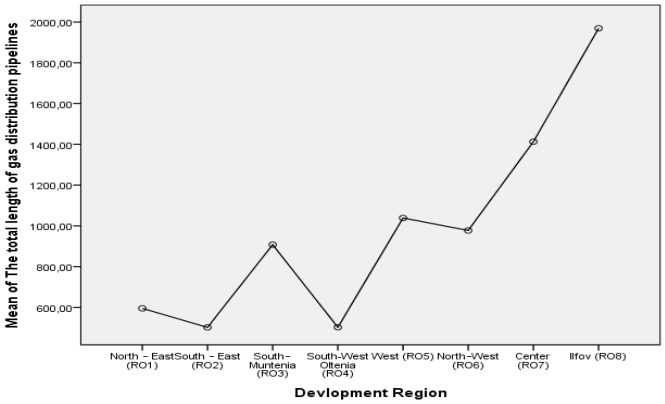

Figure 4 – Mean of the total length of gas distribution pipelines at the regional level

The results of the Bonferroni test confim that there are not significant differences in the means of Dependent Variable: The total length of gas distribution pipelines, as long as all the confidence intervals, does contain 0 value. Development of regions are not factors of interes for the level of the variable considered.

Table no. 14 – Multiple Comparisons for dependent Variable: The total length of gas distribution pipelines (km). The level of significance of Bonferroni Test

(I) Region	(J) Region	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
North – East (RO1)	South – East (RO2)	93.06667	373.68864	1.000	-1173.6359	1359.7692
	South–Muntenia (RO3)	-312.72857	360.09538	1.000	-1533.3537	907.8965
	South-West Oltenia (RO4)	92.64000	391.92795	1.000	-1235.8888	1421.1688
	West (RO5)	-443.47500	417.79660	1.000	-1859.6915	972.7415
	North–West (RO6)	-382.51667	373.68864	1.000	-1649.2192	884.1859
	Center (RO7)	-817.85000	373.68864	.997	-2084.5525	448.8525
	Bucharest-Ilfov (RO8)	-1374.15000	528.47554	.383	-3165.5379	417.2379
South – East (RO2)	North – East (RO1)	-93.06667	373.68864	1.000	-1359.7692	1173.6359
	South–Muntenia (RO3)	-405.79524	360.09538	1.000	-1626.4203	814.8299
	South-West Oltenia (RO4)	-.42667	391.92795	1.000	-1328.9555	1328.1022
	West (RO5)	-536.54167	417.79660	1.000	-1952.7582	879.6748
	North–West (RO6)	-475.58333	373.68864	1.000	-1742.2859	791.1192
	Center (RO7)	-910.91667	373.68864	.565	-2177.6192	355.7859
	Ilfov (RO8)	-1467.21667	528.47554	.249	-3258.6046	324.1712
South–Muntenia (RO3)	North – East (RO1)	312.72857	360.09538	1.000	-907.8965	1533.3537
	South – East (RO2)	405.79524	360.09538	1.000	-814.8299	1626.4203
	South-West Oltenia (RO4)	405.36857	378.98945	1.000	-879.3023	1690.0394
	West (RO5)	-130.74643	405.68397	1.000	-1505.9044	1244.4116
	North–West (RO6)	-69.78810	360.09538	1.000	-1290.4132	1150.8370
	Center (RO7)	-505.12143	360.09538	1.000	-1725.7465	715.5037
	Ilfov (RO8)	-1061.42143	518.95268	1.000	-2820.5294	697.6866
South-West Oltenia (RO4)	North – East (RO1)	-92.64000	391.92795	1.000	-1421.1688	1235.8888
	South – East (RO2)	.42667	391.92795	1.000	-1328.1022	1328.9555
	South–Muntenia (RO3)	-405.36857	378.98945	1.000	-1690.0394	879.3023
	West (RO5)	-536.11500	434.18696	1.000	-2007.8903	935.6603
	North–West (RO6)	-475.15667	391.92795	1.000	-1803.6855	853.3722
	Center (RO7)	-910.49000	391.92795	.736	-2239.0188	418.0388
	Ilfov (RO8)	-1466.79000	541.52629	.294	-3302.4164	368.8364
West (RO5)	North – East (RO1)	443.47500	417.79660	1.000	-972.7415	1859.6915
	South – East (RO2)	536.54167	417.79660	1.000	-879.6748	1952.7582
	South–Muntenia (RO3)	130.74643	405.68397	1.000	-1244.4116	1505.9044
	South-West Oltenia (RO4)	536.11500	434.18696	1.000	-935.6603	2007.8903
	North–West (RO6)	60.95833	417.79660	1.000	-1355.2582	1477.1748
	Center (RO7)	-374.37500	417.79660	1.000	-1790.5915	1041.8415
	Ilfov (RO8)	-930.67500	560.53296	1.000	-2830.7288	969.3788
North–West (RO6)	North – East (RO1)	382.51667	373.68864	1.000	-884.1859	1649.2192
	South – East (RO2)	475.58333	373.68864	1.000	-791.1192	1742.2859
	South–Muntenia (RO3)	69.78810	360.09538	1.000	-1150.8370	1290.4132
	South-West Oltenia (RO4)	475.15667	391.92795	1.000	-853.3722	1803.6855
	West (RO5)	-60.95833	417.79660	1.000	-1477.1748	1355.2582
	Center (RO7)	-435.33333	373.68864	1.000	-1702.0359	831.3692

(I) Region	(J) Region	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
	Ilfov (RO8)	-991.63333	528.47554	1.000	-2783.0212	799.7546
Center (RO7)	North – East (RO1)	817.85000	373.68864	.997	-448.8525	2084.5525
	South – East (RO2)	910.91667	373.68864	.565	-355.7859	2177.6192
	South–Muntenia (RO3)	505.12143	360.09538	1.000	-715.5037	1725.7465
	South-West Oltenia (RO4)	910.49000	391.92795	.736	-418.0388	2239.0188
	West (RO5)	374.37500	417.79660	1.000	-1041.8415	1790.5915
	North–West (RO6)	435.33333	373.68864	1.000	-831.3692	1702.0359
	Bucharest-Ilfov (RO8)	-556.30000	528.47554	1.000	-2347.6879	1235.0879
Bucharest-Ilfov (RO8)	North – East (RO1)	1374.15000	528.47554	.383	-417.2379	3165.5379
	South – East (RO2)	1467.21667	528.47554	.249	-324.1712	3258.6046
	South–Muntenia (RO3)	1061.42143	518.95268	1.000	-697.6866	2820.5294
	South-West Oltenia (RO4)	1466.79000	541.52629	.294	-368.8364	3302.4164
	West (RO5)	930.67500	560.53296	1.000	-969.3788	2830.7288
	North–West (RO6)	991.63333	528.47554	1.000	-799.7546	2783.0212
	Center (RO7)	556.30000	528.47554	1.000	-1235.0879	2347.6879

Source: SPSS Output

Comparing the Bucharest-Ilfov region to those other development regions we can easily see that the value of the length of gas distribution pipelines is always larger, like in the graphic before, but the difference is not statistically significant.

4.4. The influence of the development region on the total length of public roads upgraded

The significance level of Levene test for the variable the total length of public roads upgraded is higher then 0.05. so it shows that the variances of the 8 statistical regions are homogeneous in this case, too (Levene Statistic: 1.589, df1:7, df2:34, sig.: 0.171).

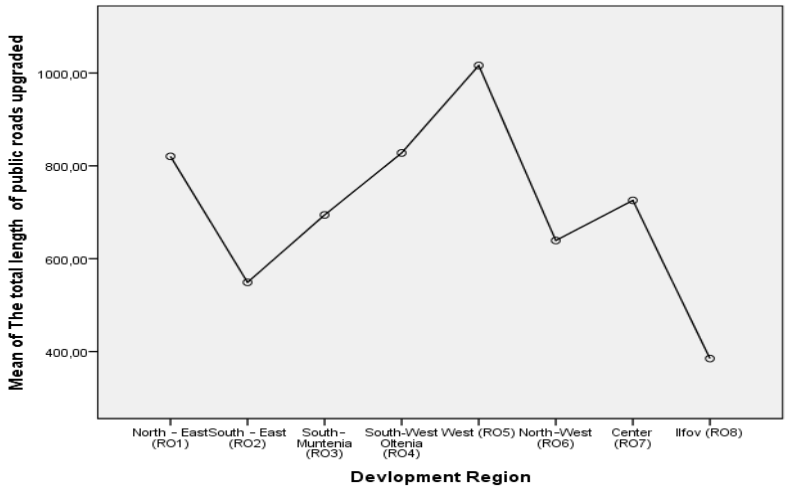

Figure 5 – Mean of the total length of public roads upgraded at the regional level

Source: SPSS Output

We can use ANOVA procedure, in order to determine the presence of significant differences between groups corresponding to development regions.

Table no. 15 - ANOVA

The total length of public roads upgraded

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	913683.355	7	130526.194	1.763	.127
Within Groups	2516578.645	34	74017.019		
Total	3430262.000	41			

Source: SPSS Output

The results of the Bonferroni test confim that there are not significant differences in the means of Dependent Variable: The total length of public roads upgraded. all the confidence intervals does contain 0 value. Development of region is not a factor of interes for the level of the variable considered.

Table no. 16 – Multiple Comparisons for dependent Variable: The total length of public roads upgraded (km). The level of significance of Bonferroni Test

(I) Region	(J) Region	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
North – East (RO1)	South – East (RO2)	271.50000	157.07431	1.000	-260.9391	803.9391
	South–Muntenia (RO3)	126.21429	151.36059	1.000	-386.8568	639.2854
	South-West Oltenia (RO4)	-7.30000	164.74093	1.000	-565.7268	551.1268
	West (RO5)	-195.75000	175.61442	1.000	-791.0350	399.5350
	North–West (RO6)	181.33333	157.07431	1.000	-351.1057	713.7724
	Center (RO7)	94.83333	157.07431	1.000	-437.6057	627.2724
	Ilfov (RO8)	435.50000	222.13662	1.000	-317.4825	1188.4825
South – East (RO2)	North – East (RO1)	-271.50000	157.07431	1.000	-803.9391	260.9391
	South–Muntenia (RO3)	-145.28571	151.36059	1.000	-658.3568	367.7854
	South-West Oltenia (RO4)	-278.80000	164.74093	1.000	-837.2268	279.6268
	West (RO5)	-467.25000	175.61442	.331	-1062.5350	128.0350
	North–West (RO6)	-90.16667	157.07431	1.000	-622.6057	442.2724
	Center (RO7)	-176.66667	157.07431	1.000	-709.1057	355.7724
	Ilfov (RO8)	164.00000	222.13662	1.000	-588.9825	916.9825
South–Muntenia (RO3)	North – East (RO1)	-126.21429	151.36059	1.000	-639.2854	386.8568
	South – East (RO2)	145.28571	151.36059	1.000	-367.7854	658.3568
	South-West Oltenia (RO4)	-133.51429	159.30243	1.000	-673.5061	406.4775
	West (RO5)	-321.96429	170.52306	1.000	-899.9909	256.0624
	North–West (RO6)	55.11905	151.36059	1.000	-457.9521	568.1902
	Center (RO7)	-31.38095	151.36059	1.000	-544.4521	481.6902
	Ilfov (RO8)	309.28571	218.13383	1.000	-430.1285	1048.6999
South-West Oltenia (RO4)	North – East (RO1)	7.30000	164.74093	1.000	-551.1268	565.7268
	South – East (RO2)	278.80000	164.74093	1.000	-279.6268	837.2268
	South–Muntenia (RO3)	133.51429	159.30243	1.000	-406.4775	673.5061
	West (RO5)	-188.45000	182.50386	1.000	-807.0883	430.1883
	North–West (RO6)	188.63333	164.74093	1.000	-369.7935	747.0601
	Center (RO7)	102.13333	164.74093	1.000	-456.2935	660.5601
	Ilfov (RO8)	442.80000	227.62230	1.000	-328.7775	1214.3775
West (RO5)	North – East (RO1)	195.75000	175.61442	1.000	-399.5350	791.0350
	South – East (RO2)	467.25000	175.61442	.331	-128.0350	1062.5350

(I) Region	(J) Region	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
	South–Muntenia (RO3)	321.96429	170.52306	1.000	-256.0624	899.9909
	South-West Oltenia (RO4)	188.45000	182.50386	1.000	-430.1883	807.0883
	North–West (RO6)	377.08333	175.61442	1.000	-218.2016	972.3683
	Center (RO7)	290.58333	175.61442	1.000	-304.7016	885.8683
	Ilfov (RO8)	631.25000	235.61147	.316	-167.4086	1429.9086
North–West (RO6)	North – East (RO1)	-181.33333	157.07431	1.000	-713.7724	351.1057
	South – East (RO2)	90.16667	157.07431	1.000	-442.2724	622.6057
	South–Muntenia (RO3)	-55.11905	151.36059	1.000	-568.1902	457.9521
	South-West Oltenia (RO4)	-188.63333	164.74093	1.000	-747.0601	369.7935
	West (RO5)	-377.08333	175.61442	1.000	-972.3683	218.2016
	Center (RO7)	-86.50000	157.07431	1.000	-618.9391	445.9391
	Ilfov (RO8)	254.16667	222.13662	1.000	-498.8159	1007.1492
Center (RO7)	North – East (RO1)	-94.83333	157.07431	1.000	-627.2724	437.6057
	South – East (RO2)	176.66667	157.07431	1.000	-355.7724	709.1057
	South–Muntenia (RO3)	31.38095	151.36059	1.000	-481.6902	544.4521
	South-West Oltenia (RO4)	-102.13333	164.74093	1.000	-660.5601	456.2935
	West (RO5)	-290.58333	175.61442	1.000	-885.8683	304.7016
	North–West (RO6)	86.50000	157.07431	1.000	-445.9391	618.9391
	Ilfov (RO8)	340.66667	222.13662	1.000	-412.3159	1093.6492
Ilfov (RO8)	North – East (RO1)	-435.50000	222.13662	1.000	-1188.4825	317.4825
	South – East (RO2)	-164.00000	222.13662	1.000	-916.9825	588.9825
	South–Muntenia (RO3)	-309.28571	218.13383	1.000	-1048.6999	430.1285
	South-West Oltenia (RO4)	-442.80000	227.62230	1.000	-1214.3775	328.7775
	West (RO5)	-631.25000	235.61147	.316	-1429.9086	167.4086
	North–West (RO6)	-254.16667	222.13662	1.000	-1007.1492	498.8159
	Center (RO7)	-340.66667	222.13662	1.000	-1093.6492	412.3159

We tested if the development region is a significant factor of influence for the level of the indicators considered. By computing the R-squared value (R-Sq) for each of them, the results indicates that the factor only explains less than 11-36 % of the total variation hence so, it is not a very good explanation at all.

5. Conclusions

Romania's 8 development regions correspond to NUTS II level divisions in the EU and one of their function is to allocate funds from the EU regional development. Developing regions coordinate regional infrastructure projects since 2007 when Romania joined to EU and its development regions became members of the Committee of the Regions and their influence in attenuation the Romania disparities at the territorial level are evident. Typology groups of regions were achieved from the use of fundamental features of regional economic and social development with a view to reducing regional disparities. (Iordan. M., Chilian. M-N.).

In other words, is well known the role of the development regions for homogenization the sustainable development indicators in territorial level. Based on the actual state, can note that regarding technical infrastructure for the main

categories of public utilities on territorial level there are not statistically significant differences between any Romanian development regions. Even if the study revealed no obvious disparity elements, comparing Bucharest-Ilfov region or West region to those other development regions reflect that the values of public utility indicators is different, these differences are not statistically significant.

Counties in which urban areas are characterized by increased economic potential default determine a considerable difference compared to other counties, intra and inter regional. But, not only economical potential determinate the level of infrastructure, geographical characteristics of zones are factors of influences which can create problems in region development.

REFERENCES

[1] **Androniceanu. A.(2003),** ***New Public Management***, Economic Publishing House, Bucharest;
[2] **Babucea, A.G., Danacica, D.E. (2008),** ***Statistical Analysis of the Variance of Net Nominal Mounthly Earnings by Development Regions in Romania***, Annals Economy Series, No.1. 2008, pp.21-32 ;
[3] **Benţe. C. (2009),** ***Public Service Management***, Lecture, ”Vasile Goldis” University Press, Arad ;
[4] **Buruiană. A. I. (2009),** ***Analiza statistică a dezvoltării regionale din Romania***, PIM, Iasi;
[5] **Nausbanner. J.(1984),** ***Les services: nouvelle donnée de l’economie,*** Ed. Economique, Paris;
[6] **Iordan. M., Chilian. M-N. (2014),** ***The Sectoral Structures in Romania, its Regions and the EU Countries - Key Features of Economic and Social Cohesion***. Procedia Economics and Finance., pp 397;
[7] **Negruţ V. (2008),** ***The Legal Regime of Public Utilities Services ;*** Transylvanian Review of Administrative Sciences. No. 1 (21)/2008. pp. 99-104;
[8] **Parlagi. A.P. (1994),** ***Management of Local Government***. Print Art Publishing House, Bucharest;
[9] **Parlagi, A.P., Costea. M., Plumb I., Dobrescu R.(2003),** ***Management of Local Government - Public Services***. Economic Publishing House, Bucharest;
[10] **Plumb, I., Androniceanu, A., Abaluta, O. (2003),** ***Management of Public Services.*** ASE, Bucharest;
[11] **Tordjman, A.(1993),** ***Strategies des concurrences dans le commerce: les services aux consummateurs,*** Les Editions d’organisation. Paris;
[12] http://ec.europa.eu/services_general_interest/index_en.htm. accessed on January 15, 2016 ;
[13] http://www.anrsc.ro/index.php?option=com_content&view=article&id=111%3Astirea-2&catid=51%3Astiri&Itemid=53. accessed on December 6, 2015 ;
[14] http://www.infoeuropa.ro. accessed on January 16, 2016 ;
[15] http://statistici.insse.ro/shop/index.jsp?page=tempo2&lang=ro&context=75. accessed on January 12, 2016.