

# Competitiveness and sustainable development in public services

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**Abstract** *The last years were of profound transformation in public services that knows more or less the challenge from the private sector. A second dimension of competitiveness for the public services starting from 2007 was the free access of the citizens to at least education and health services in European Union. The paper aims to show the evolution of the cohabitation of the public and private sectors on the services of public interest, their development and evolution in different regions. Identifying and highlighting the key issues in competitiveness and quality of the services provided, will give us the main lines for the further development and public policies that should be considered. Considering the cohesion policy of European Union, an analysis of the public and private sectors in public services in Romanian counties could drive us to a conclusion about the affordability and the quality of the services. Using the statistics it can be show the regional distribution of the service providers especially for education, health, water supply and other services. The integrated analysis we offer a global picture of the regional potential and development. Based on the findings the public decision makers could better set up the sectorial public policies and the public spending. Never the less, the European support could be also directed to increase the quality and efficiency of the public services.*

**Keywords:** competitiveness, sustainable development, regional distribution, affordability, quality management, public services

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## Introduction

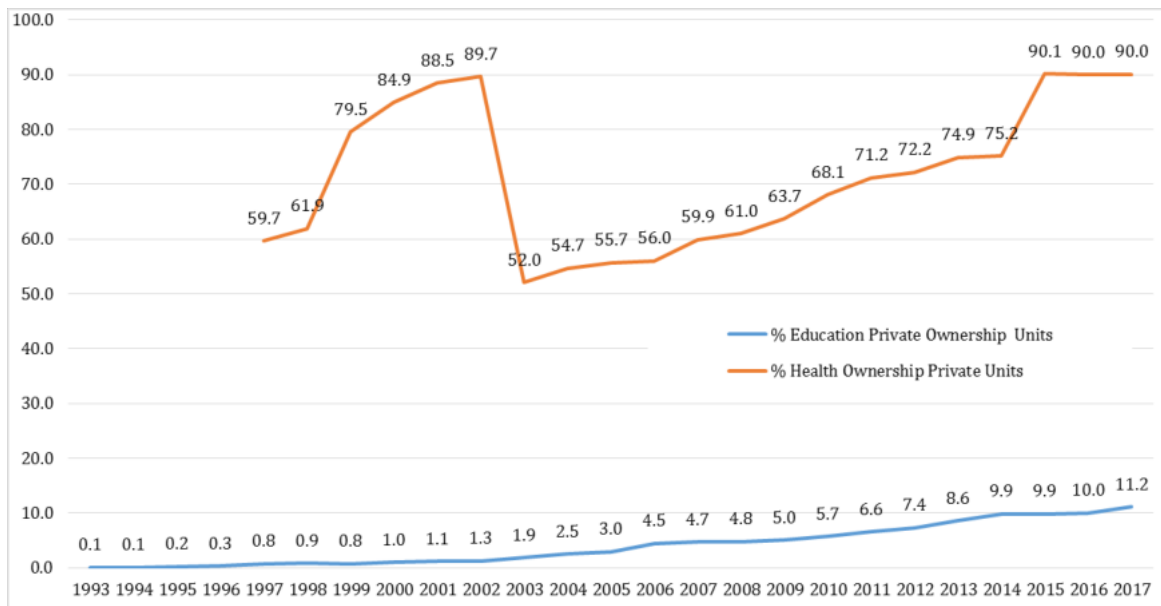
Public services delivery at the local level by private ownership organizations become a mark of sustainable competitiveness.

Garcia (1997) announced since 1997 that the private sector is essential for sustainable development. Corrigan, Crotti, Hanouz, and Serin, (2014) argues for a new shape of public services design and delivery to respond to sustainable competitiveness demands. Endogenous growth based on innovation creates added value in a globally competitive world, at the local level.

The purpose is to make a spatiotemporal profile of private ownership changes in public interest services (Health, Education and Social Assistance) in Romania. The analysis covers the 2010-2017 period, at the county level (NUTS3).

Romania as all the Eastern European Countries increased the private ownership share. This process of privatization was a global economic phenomenon of the 1990s (Goodman & Loveman, 1991).

Health sector infrastructure presents the highest share of mainly private ownership units in total units modification from 59.7% in 1996 to 90% in 2017 (Figure1), almost 10pp/decade. Education sector infrastructure is the second public service with a continuous trend of increasing share of the mainly private ownership units in total unit's modification from 0.1% in 1993 to 11.2% in 2017. (Figure 1)



**Figure 1. The share of private ownership in Education and Health infrastructure in Romania during 1993-2017.**

Source: Authors' own research results/contribution

Our hypothesis is that the increasing of private ownership in organization of public interest services, improves their competitiveness and quality through: accessibility, affordability, efficiency, productivity, institutional management, organizational change, interest as a consequence of the change in the ownership rights from public ownership right to civil right, funding system (tax versus direct funding), propensity to innovate, decision making, private/ public cooperation, price formation of the services provided, short term versus long term potential, etc. of the public services.

We create a *Partial Public Services Index of private ownership* to highlight the structural change of private ownership share in organizations. Health sector is the subject of a supplementary specific diversity analysis in view to compare the public /private

diversification of health services provided by type of ownership of infrastructure. Based on these research findings the public decision makers could better set up the sectorial public policies and the public spending.

### **Literature review**

Public services concept is multidimensional in the new paradigm of the Sustainable competitiveness (Corrigan et al., 2014). The changes between public & private ownership reflects the cycle stage, crises manifestation, political ideology, and innovation adoption in a global context.

#### ***Public services concept***

Public services concept is not standardized yet. Syvertsen, (1999, p.7) sees that public service could have the public utility sense, public sphere of the commons, and public as consumers of the media. Burchardt (1997) and SDSN (2016) identifies three dimensions of “private welfare”, provision, finance and decision, each of which may operate independently of the others. SDSN (2016) public services included in SDG (Sustainable Development Goals) respectively, water, sanitation, health, education, planning, waste management, and transport, are in the responsibility of local governments and authorities, as well as in Romania. In 2016 United Nations sees the public service as the “an activity of general interest performed by an organization, that is, by a legal person, authorized by a public administration authority” (Florea, 2008a).

Public service is an activity of general interest, voluntarism (exists by the public powers intension only) and formal (function under the administrative public right and has to be under public power control authority). Health, culture, and education are exceptions from the general definition, private persons provide them, but without public power prerogatives. The education, health and social assistance were listed among the NACE main families of sectors with Public Services finality, as it is mention by Florea (2008, p. 49).

#### ***Innovation adoption in public services trends***

United Nations (2016, p.49) define that „promoting innovation in public administration means fostering *efficient, effective, sustainable and people-centric services*. It also means enabling cooperation, partnership and participation, which fuels economic growth and sustainable choices”.

Bloch and Bugge (2013) argued for a systemic perspective on innovation across public, civic and private realms. As a result of increasing *of innovation adoption in public and business* sector organization there are some:

- a) Similitudes like the characteristics of innovation patterns and practices in service production, intermediate objectives and measures
- b) Differences like the *main objectives of innovation for businesses* is focused on change and efficient implementation, based on internal decision. In the same time, in public sector changes may be politically mandated and potentially reversed within a short period, based mainly on external decision.

#### ***Sustainable competitiveness***

Corrigan et al. (2014) make the distinction between sustainable competitiveness and sustainable development. Authors places the productivity as a driver of prosperity and long-term growth as the core essence of the sustainable competitiveness. They „define sustainable competitiveness as the set of institutions, policies, and factors that make a nation productive over the longer term while ensuring social and environmental sustainability.” (Corrigan et al., 2014) Health, participation, and security are objectives of Social sustainability.

SolAbility (2015b) define Sustainable competitiveness as “the ability to generate and sustain inclusive wealth without diminishing future capability of achieving and sustaining current wealth levels.” Its competitiveness model (Figure2) quality of public service is equivalent to perceived life satisfaction.



**Figure 2. The Sustainable Competitiveness pyramid**

Source: (SolAbility, 2015, 16)

(Faucheux & Nicolai, 2009) founds the “State Delegation on Public Policy Networks”. (Bilbao-Osorio et al., 2013) points that competitiveness is a necessary condition for improved living standards.

In 2014 Romania’s quality of public services have the 57.1 score and 17<sup>th</sup> rank/180 of Governance Sub-Index by country. SolAbility (2015), Cecilia & Jurcuț (2015) founds that the “environment that supports high levels of wellbeing (socio-economic development, social inclusion, public health) is becoming an important driver of competitiveness as country’s endeavors to attract and develop world-class companies and workers”. Ciobanu & Pană (2011) points that entropy-value theory model is useful in building the new knowledge – based economy.

#### *Public vs private*

Zaharia (2003) mention that the Romanian Constitution dedicates in Art. 135, Par. 2, two forms of property: public (Art. 1 from Law No. 213/1998) and private (Law No. 18/1991). The attributes of ownership (possession, utilization and disposal), exclusively and perpetually belong to the state in the first case and to natural or legal persons, to state or administrative – territorial units in the second case.

Hoffman (2019) points that in the case of (pure) public goods “the private market does not have a mechanism for determining each person’s benefit from having such goods available” and have the acceptable politically to fund thorough the tax system.

Public versus private value added differences are illustrated by (Matthews & Shulman, 2005). The basis of sustainable competitive advantage of a firm stems from „reputation,

innovation, architecture, and strategic assets” (Matthews & Shulman, 2005 cites Kay, 1995). Successful private sector firms use their capabilities to add value by using these capabilities in a proactive way in their interest while the public sector organization have to fulfil the responsibilities of government and are expected to cooperate in the policy development and the delivery of services. points that between private and public ownership is a continuum, covered by different types of Public Private Partnerships (PPP) (Matthews & Shulman, 2005; Colverson & Perera 2012).

Garcia (1997) mention the Second generation” reforms—the private sector assumes environmental and social objectives, but only under the criteria of profitability.

Between private and public ownership of infrastructure there are several *public-private cooperation (PPC) in education and health care* (Schaeffer & Loveridge, 2002). Regarding PPC, authors emphasize a presence a typology by the main dimensions: Goals, Coordination and Resources, with the characteristics like: purpose, decision making, rewards, risks, formal agreement and duration. Chanapai and Suttawet (2018) exemplify the PPC as a new tool able to provide workforces and development of labor force efficiency in the motorcycle industry (in Thailand).

Sustainable competitiveness could be obtained through PPC (Colverson & Perera 2012) which “*deliver a range of essential public services to even the most remote areas and marginalized communities*”. The same authors, highlight that “PPPs are not to be confused with privatization, where a service or facility is fully transferred to the private sector by sale/disposal, including all the associated assets and liabilities, for operation according to market forces”. Goodman and Loveman (1991) warn that “the privatization debate should be on the nature of organizational changes, not on a broad ideological debate over the role and efficacy of government”.

Next to organizational change there are other important difference - see Table 1.

**Table 1. Differences between the enterprises of public sector and private sector**

<b>Basis of difference</b>	<b>Private sector enterprises</b>	<b>Public sector enterprises</b>
1. Objective	Maximization of profit.	Maximize social welfare and ensure balanced economic development.
2. Ownership	Owned by individuals.	Owned by Government
3. Management	Managed by owner and professional managers.	Managed by Government.
4. Capital	Raised by owners	Raised from Government through loans, private funds and sometimes sources and public issues, through public issues.
5. Area of operation	Operates in all areas with adequate return public utility sectors.	Operates in basic and on investment

Source: Prasad P. coord. (2015), p.168

SolAbility (2015) emphasize „the lack of innovative edge required to compete in the globalized markets”, i.e. internationalized education sector.

Based on Table 2, regarding public / private cohabitation is need to emphasis in line with (Goodman & Loveman, 1991) that ownership form is very less important than the dynamics of the market or institution that produces the public services, as well as is less important to privatize than how to privatize.

**Table 2. Public sector expansion advantages and disadvantage**

<b>advantages private management</b>	<b>disadvantages</b>
-boosting the efficiency and quality of remaining government activities through cost cutting and greater attention to customer satisfaction	Private managers will not serve the public interest
- reducing taxes	privatization involves the displacement of one set of managers entrusted by the shareholders—the citizens—with another set of managers who may answer to a very different set of shareholders
- shrinking the size of government. In the functions that are privatized, they argue, the profit-seeking behavior of new, private sector managers will undoubtedly	Management control need. Is need to control and performance measurements of the private owners not only on short-term performance measurements but also on long term
	Insufficient competition <sup>1</sup> on market: a lack of competition for government contracts actually leads to higher costs and creates perceptions of corruption. high cost, collusion, and corruption
	Creating and enlarging a private class of private contractors dependent of public funding
	Private companies provide only services with profit , “leaving public institutions as service providers of last resort for the highest cost population or operations”

Source: selection made by authors following (Goodman & Loveman, 1991)

## Methodology

The research methods used are the map representation using ESDA techniques, Composite Index building as quantitative perspectives. The Relative Entropy calculation for the health infrastructure provide a qualitative one.

The main research hypothesis is: Private ownership expand in Public Services Infrastructures in locations (counties) with sustainable competitiveness. The secondary one is: private/public ownership structure have an optimum frontier

The arguments for defining them are:

### **Quantitative perspective:**

The spatial distribution at NUTS 3 level of Public Services units’ ownership are identified using some tools from Exploratory Spatial Data Analysis (ESDA). From the ESDA techniques we use the Choropleth Maps which represents “Counterpart of Histogram, where are values/attributes for discrete spatial units with associate colors palette (Anselin, 2002). The maps uses geocoded data and we represents the variables using 5 classes **Natural Breaks (Jenks) Classification. This classification technique is an optimization method for Choropleth Maps, minimizes variation in each group, applied in Arc GIS desktop 9.3. This method allows identifying clusters where data values are “placed into a single class. Class breaks occur where there is a gap between clusters.” In this case, “data is unevenly distributed; that is, many features have the same or similar values and there are gaps between groups of values”(ArcGIS 9.2. Desktop Help, 2008)**

<sup>1</sup> Harmonization of the public interest with private one request a new market creation with competition among the public services providers, selected by clear criteria’s of the real public interest of the citizens.

Maps overlay in view to identify spatio-temporal patterns and multi-dimension phenomenon Arc Gis Desktop. (McHarg, 1971) used for the first time the superimposing of different maps, a process well-known as a map overlay.

We follow the main steps for constructing an composite indicator (*Handbook on Constructing Composite Indicators*, 2008): selecting variables, treatment of missing data, normalization of data using Arc Gis' 5 classes Natural Breaks (Jenks) Classification, equal weights:

$$M_{cjt} = M_{cpvjt} + M_{cpbjt} \quad [1]$$

$$pM_{cjt} = M_{cpvjt} / M_{cjt} * 100 \quad [2]$$

$$dpM_{cj} = pM_{cjt2} - pM_{cjt1} \text{ [Jenks 5 classes normalising]} \rightarrow [1 - \text{lowest } dpM_j; 5 - \text{highest } dpM_j] = IMc \quad [3]$$

$$I_{SP\_pvj} = \sum_{c=1}^3 IMc_j \quad [4]$$

$$I2_{SP\_pvj} = I_{SP\_pvj} / (5 * c) \quad [5]$$

Where  
c- number of Pillars  
M – measure in the pillar  
j – county  
Pb = public ownership  
Pv- private ownership  
t – year (t1=2010; t2=2017)

Based on data focusing on private ownership characteristic we calculate the sub index for Public Services in 3 Pillars (Annex 4): Health, Education and Social Assistance.

**Qualitative perspective**

In the case of Heath Public Services we calculate the **Shannon Wiener Diversity Index or Shanon Entropy** (Lazar, 2010; O’Connell, 2016) for both public and private ownership by the 30 types of units ( see Annex 1) :

$$H_p = \sum_{j=1}^p F_j * \ln F_j \quad [6]$$

$$H_{max} = \ln p \quad [7]$$

$$H_{rel} = \frac{H_p}{H_{max}} \quad [8]$$

Where: F relative species frequency  
Hp – informational entropy  
Hrel – relative entropy  
Hmax – maximum entropy  
p number of individuals by specie

The software programs used for processing statistical data were: SPSS Statistics 23, xls and Arc Gis 9.3.

**Data at NUTS 3 level, public services infrastructure by type of ownership:**

Public/ private ownership activity sectors –health, education and social assistance for the public services, input for the index, are selected from the list of (Florea, 2008). Data used are from TEMPO /INS : Health ( SAN101B - Sanitary units, by category of units, ownerships); Education (SCL101A - Education units, by categories of units, ownerships) and Social assistance (ASS113E - Hostels for elderly persons, ASS119A - Public social benefit canteens and ASS119B - Private social care canteens).

Because the data sets for RDI are only at the NUTS0 level (CDP101B) and the Public Utilities of Local Interest do not have the ownership characteristics we shall ignore these public sectors from our model. In consequence, our index is partial.

**Sustainable Competitvity dimension is:**

$$\mathbf{GDP/capita}_{NUTS3} = \mathbf{GDP}_{NUTS3} / \mathbf{P}_{NUTS3} \quad [9]$$

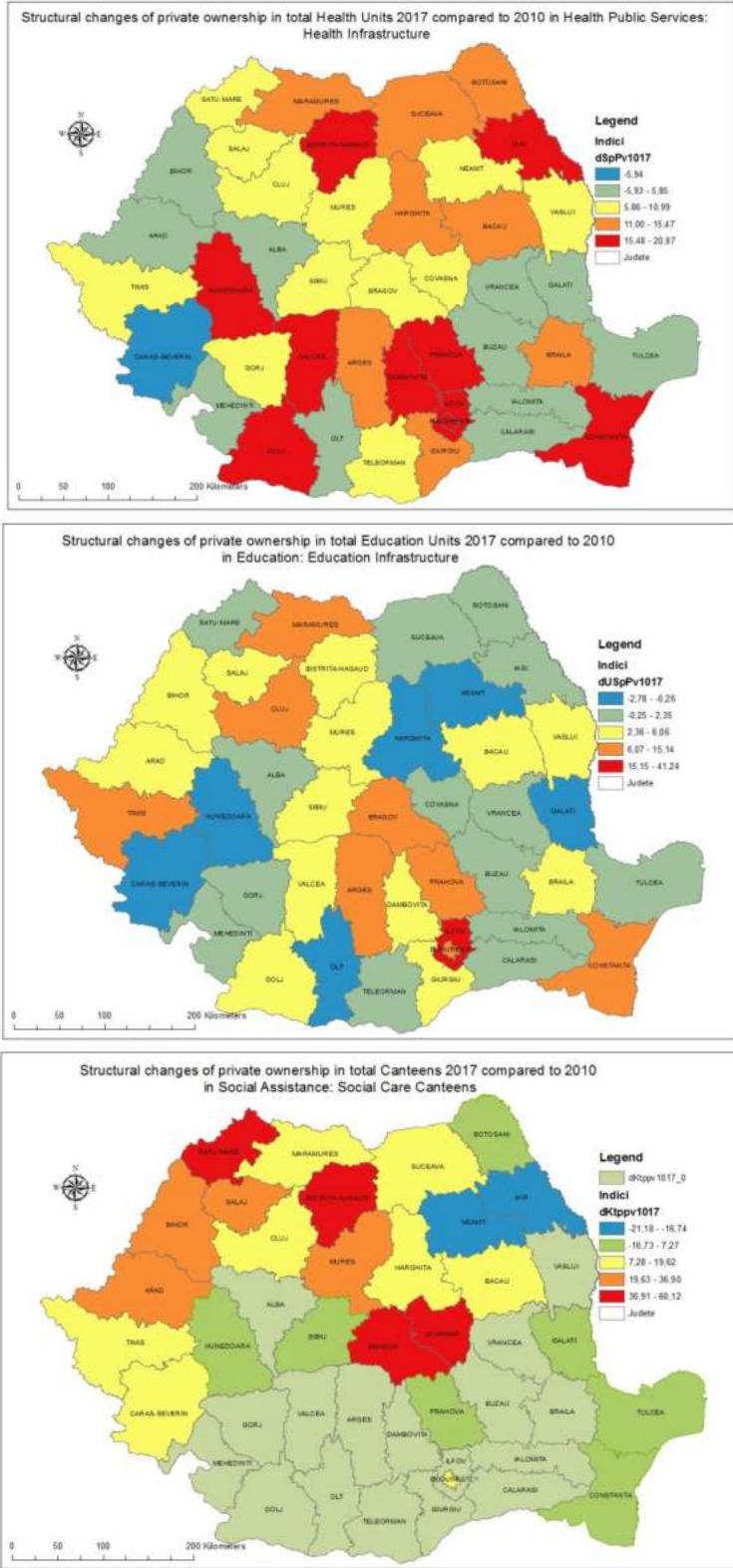
**Where: P: Population** (POP107D - Permanent resident population)

**GDP<sub>NUTS3</sub> : Gross Domestic Product** (CON103I - GDP - calculated according CANE Rev.2 - ESA 2010)

## Results and discussions

Figure 3 illustrate the spatial heterogeneity of private ownership structural modification infrastructure in health, education and social assistance, at county level during 2010-2017. Is visible that the spatial pattern is different by sector and amplitude / intensity of structural change. Health sector presents the North –South pattern of private ownership. The private ownership is expanding over 15.5pp in North area around the nucleus: Bistrița Năsăud and Iași; in South area in the cluster București, Ilfov, Prahova & Dâmbovița, Dolj, Vâcea & Hunedoare and more isolated in Constanta. The outlier is Caras Severin the county with public ownership shrinking with almost 6pp during 2010-2017. Education sector presents clear private ownership expansion in Ilfov with 41,2pp increase. In Bucharest, Prahova, Brasov and Argeș; Maramureș & Cluj; and Timiș and Constanța in a rage over 6pp to 15pp. Important sinking of private ownership in Education’s infrastructure is visible in Caraș Severin & Hunedoara, Neamț & Harghita, Olt and Galați, where the private ownership share decrease below -0,25pp. Social Assistance: Social Care Canteens with data for the Northern half of the country illustrate the highest variability of structural changes. Brașov & Covasna, Bistrița and Satu Mare present expansion of private ownership over 36, 91pp to 60pp, Shrinking of private ownership is visible in Iasi and Neamț with structural changes decrease from -21,2pp to 16,7pp.

In Figure 4 is pictured the specific diversity of unit types from health infrastructure by ownership both public and private. If entropy is 0 then will be only one species, the H is maximum when all species (the 30 type of units from the health infrastructure) are equally distributed. To compare the specific diversity of public and private health infrastructure we use the relative entropy level, considering 0 for no diversity, and 1 for equally distribution.



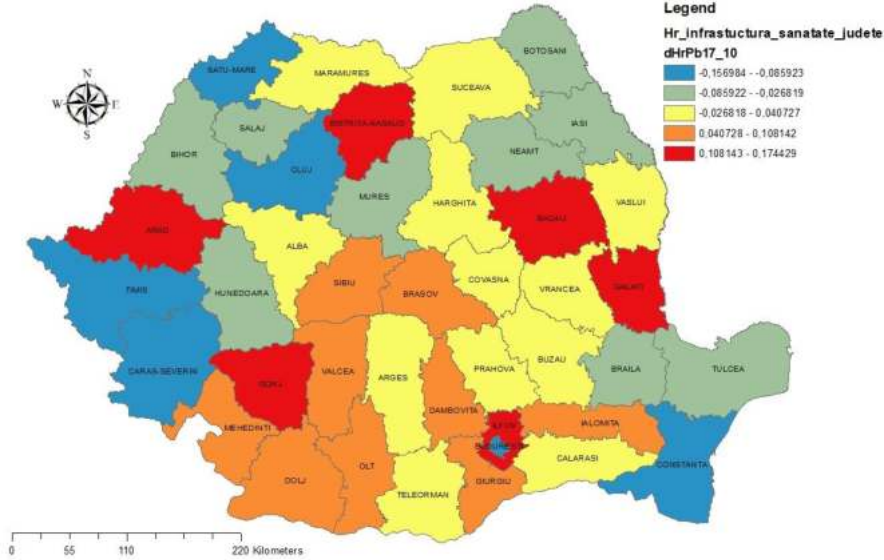
**Figure 3. The Public Partial Private Ownership Index Pillars during 2010-2017 by counties: Health, Education and Social Assistance – structural changes of private ownership**

Source: Maps made by Authors in Arg Gis 9.3, ESRI Romania Shapefile, Data INS /TEMPO.

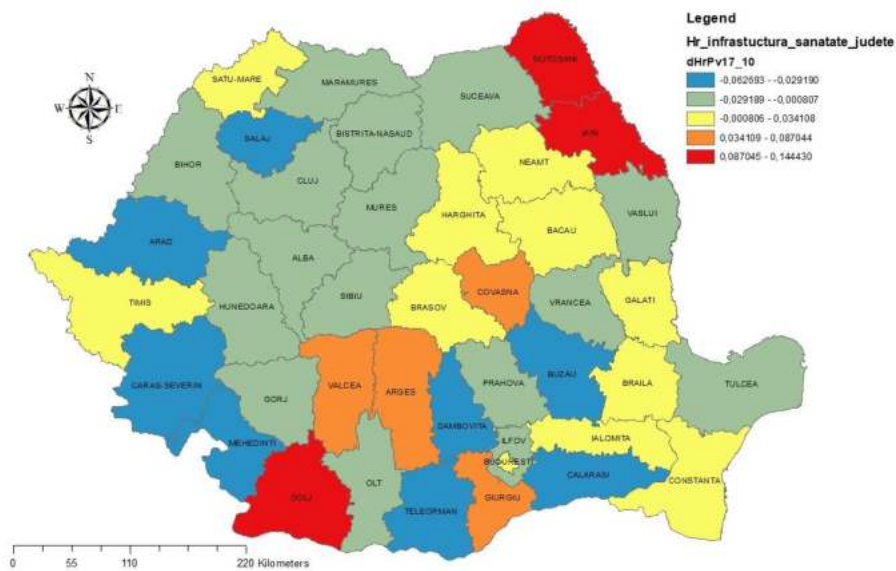
During 2010-2017 the private ownership is highly diversified in Botoșani & Iași and Dolj while is with the lowest degree of diversification in Buzău, Călărași, Dâmbovița, Sălaj, Arad Caraș and Mehedinți.

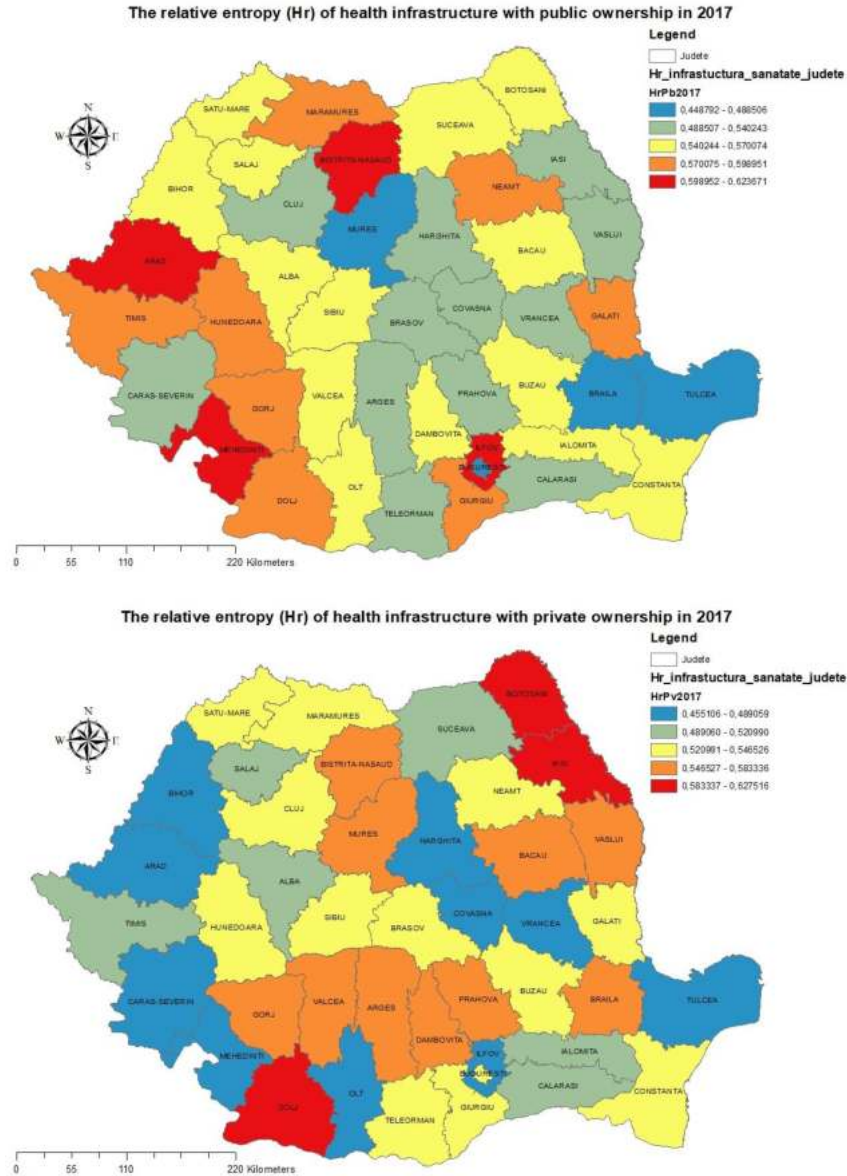
In 2017 there were 60 thousand units in the health infrastructure from which 90% with private ownership. During 2010 -2017 period the number of units increases with 19.3% growth rate based on expanding the private ownership with 36.6% growth rate while the public ownership decreases with 62.8% growth rate. The share of private ownership in health infrastructure increases with 22pp in 2017 compared to 2010.

The relative entropy (Hr) of health infrastructure with public ownership variation during 2010-2017 period



The relative entropy (Hr) of health infrastructure with private ownership variation during 2010-2017 period





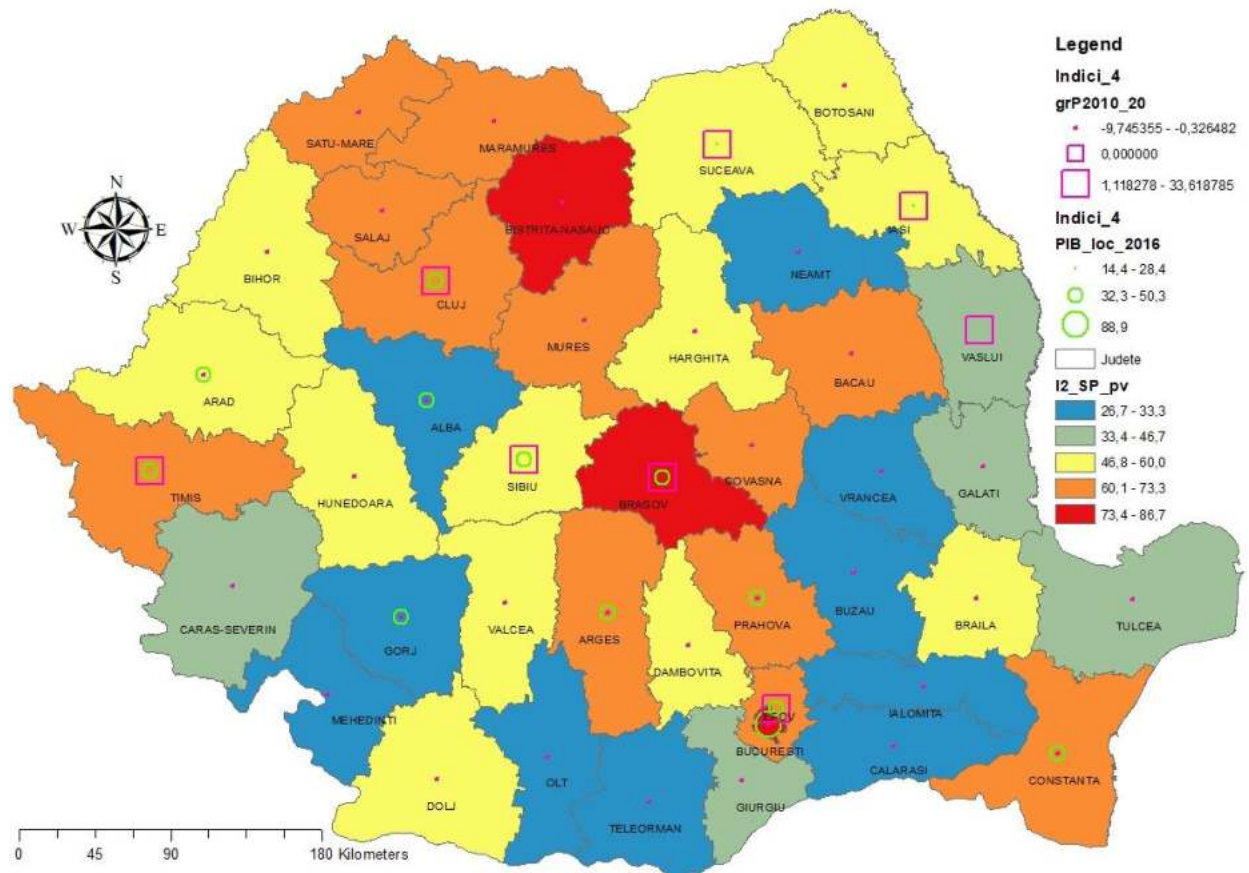
**Figure 4. The specific diversity of unit types from health infrastructure by ownership**

Source: Map made by Authors in Arg Gis 9.3, ESRI Romania Shapefile, Data INS /TEMPO.

This process is highly dependent by the function of the unit type. Dentist's Surgeries, Specialty Medical Surgeries and Family Surgeries counts each over 11 thousand private units in 2017, with very few public units. On the other side Mental Health Centers, Transfusions Centers and Tuberculosis Sanatoria all are public ownership units, few in number.

Figure 5 maps the Public Partial Private Ownership Index during 2010-2017 by counties, the population growth rate during 2010-2018 and GDP/capita in 2016. București and Brașov are the 2 counties that register the highest level of Private Ownership Index associated with the highest level of GDP/capita and population growth. Timiș & Cluj also presents high level of Private Ownership Index on the background of income increasing and population growth as a measure of high quality of life. For these counties the results are in line with the (SolAbility, 2015) conclusion at NUTS 0 that the “the leading nations in the

Sustainable Competitiveness ranking are mostly high-income countries, suggesting a certain correlation between Sustainable Competitiveness score and GDP per capita or income levels (high income = high sustainability)”.



**Figure 5. The Public Partial Private Ownership Index during 2010-2017 by counties, the population growth rate during 2010-2018 and GDP/capita in 2016**

Source: Map made by Authors in Arg Gis 9.3, ESRI Romania Shapefile, Data INS /TEMPO.

Olt, Teleorman, Neamț, Vrancea, Buzău, Ialomița, Călărași there are counties with low level of income per person and also with population negative growth rates. For these counties is indicated a low access and affordability to public services. These results are in indicates that in these counties “there is inequity in access to health care, with differences among various socioeconomic groups (the unemployed and self-employed, pensioners, agricultural workers, and the Roma population) and between urban and rural areas.” (European Commission et al., 2017)

Bistrita, Bacău, Satu Mare, Salaj, Mureș, and Covasna, are counties with high level of the private ownership index but with low level of income/ capita and low level of population growth. In these locations is visible the risk of low affordability of services coupled with the risk of low competition market, creating and enlarging a private class of private contractors dependent of public funding. For sure for this category is requested further research to clarify if exists positive externalities of public services private ownership new structure.

In the particular case of health, is confirmed the high spatial heterogeneity of the access to these services. Unmet needs for medical care in Romania vary substantially by income group while the contracted private providers can charge extra for the services they provide (European Commission et al., 2017). Affordability is the main reason for perceived unmet health care needs. Although public hospitals are nominally evenly spread across the country, 90% are in urban areas and private hospitals are almost exclusively in larger cities and the more affluent areas. The Danube Delta and remote mountain regions face particular challenges. Costs of travel, the time involved and the poor transport infrastructure increases this burden. (European Commission et al., 2017).

Health services covers only around 86% of the Romanian population, including in statistics the 3–4million Romanians that are working abroad. Agglomerations of vulnerable (i.e Roma, persons without health insurance) groups are still not covered. Militaru et. al (2010) request the PPP as a viable solution for some societal disadvantaged groups, especially the persons with disabilities.

## Conclusion

The main contributions of the paper is the picture of private ownership expansion/ shrinking in some important Public Services: Social Assistance, Education and Health sectors, both in space (county level) and time (2010-2017) in Romania. Secondary contribution is the Health sector infrastructure (of 30 typologies of units) analyze in the perspective of diversity at county level. On this case, results the functional divide between public and private ownership is by strategically importance (transfusion centers) and profit perspective (Mental Health Centers versus Dentist's Surgeries). Strategically is not covered by private ownership, conclusion in line with Goodman and Loveman (1991), that there "are elements of democracy whose value is not reducible to efficiency." Private ownership is appropriate in the nonstrategic sectors, where the efficiency increasing is an added value.

The spatial ownership index of the public services follow the spatial development pattern. This result indicates, that in developed counties, Public Services to function as a factor of sustainable competitiveness.

The main limit is the narrow analysis only on tree sectors, sectors covered by the official statistics regarding the infrastructure ownership. Further analysis for public utilities of local interest by ownership with data from the Secondary Sources (ministries data bases) **could be of interest.**

**The increasing presence of private ownership in public services shows the presence of Packages of changes: a change in institutional management including a radical organizational change, a change in the interest as a consequence of the change in the ownership rights from public ownership right to civil right, a change in the funding system (tax versus direct funding – not covered in our research), a higher propensity to innovate, a radical change in decision making, a diversification in private/ public cooperation, a change in the price formation of the services provided, increasing interest** of increasing the long term potential, and increase in efficiency.

In short, these changes indicates the qualification of public services in developed counties to adopt sustainable competitiveness paradigm in Romania at local level too.

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**Annex 1**

**The NOMENCLATOR OF PROPERTY FORMS in Romania according to ANAF**

**STATE PROPERTY**

**Autonomous Regies**

**Commercial companies with full state capital**

**Other State Unitary Units Transformed into Commercial Companies or Autonomous Regies**

**National companies and companies**

**MIXED PROPERTY (with state and private capital)**

**MIXED PROPERTY (with state capital - less than 50%)**

**Commercial companies with domestic and foreign state capital**

**Commercial companies with state and private domestic and foreign capital**

**Commercial companies with state and private domestic capital**

**Commercial companies with state and foreign private capital**

**Commercial companies with domestic and foreign state capital**

**Commercial companies with state and private domestic and foreign capital**

**Commercial companies with state and private domestic capital**

**Commercial companies with state and foreign private capital**

**INDIVIDUAL PROPERTY - PRIVATE (with capital: private native, private native and foreign, foreign private, agricultural companies)**

**Collective partnerships**

**Commercial companies in simple partnerships**

**Joint stock companies**

**Joint stock companies**

**Limited liability companies**

**Agricultural companies**

**Commercial companies with state capital, privatized during 2007**

**COOPERATIVE PROPERTY**

**Consumer cooperatives**

**Cooperative craftsmen**

**Non-transformed agricultural cooperatives and associations**

**Credit cooperatives**

**OBSTETASCAL PROPERTY (commercial companies belonging to political and public organizations and institutions)**

**Source: ANAF,**

**[https://static.anaf.ro/static/10/Anaf/AsistentContribuabili\\_r/Nomenclator\\_forme\\_juridice.htm](https://static.anaf.ro/static/10/Anaf/AsistentContribuabili_r/Nomenclator_forme_juridice.htm)**

Annex 2

**The health sector's infrastructure "species" (S=30)**

- 1 Civil medical company
- 2 Civil medical dental company
- 3 Dental technique labs
- 4 Dentist's surgeries
- 5 Diagnosis and treatment centers
- 6 Dispensaries
- 7 Family surgeries
- 8 Health and social care units
- 9 Health centers
- 10 Hospitals
- 11 Integrated ambulatories of the hospital
- 12 Medical labs
- 13 Mental health care centers
- 14 Nurseries
- 15 Other types of surgeries
- 16 Pharmaceutical offices
- 17 Pharmaceutical storehouses
- 18 Pharmacies
- 19 Polyclinics
- 20 Preventoria
- 21 School medical surgeries
- 22 Speciality civil medical company
- 23 Speciality medical centers
- 24 Speciality surgeries
- 25 Specialized ambulatories
- 26 Student medical surgeries
- 27 Surgeries
- 28 Transfusion centers
- 29 Tuberculosis sanatoria
- 30 Watering sanatoria

Source: SAN101B - Sanitary units, by category of units, ownerships, counties and localities

Annex 3

The relative entropy indices for heath Infrastructure in 2010 and 2017

FID		HrPb2010	HrPb2017	HrPv2010	HrPv2017	dHrPb17_10	dHrPv17_10
0	Alba	0,56	0,57	0,54	0,52	0,01	-0,02
1	Arad	0,45	0,61	0,49	0,46	0,16	-0,03
2	Arges	0,52	0,51	0,53	0,57	0,00	0,05
3	Bacau	0,43	0,56	0,53	0,56	0,13	0,03
4	Bihor	0,61	0,55	0,47	0,46	-0,06	-0,01
5	Bistrita-Nasaud	0,49	0,62	0,59	0,58	0,13	0,00
6	Botosani	0,59	0,56	0,51	0,62	-0,04	0,11
7	Braila	0,51	0,48	0,56	0,56	-0,03	0,00
8	Brasov	0,46	0,52	0,52	0,54	0,06	0,02
9	Buzau	0,56	0,56	0,56	0,53	0,00	-0,04
10	Calarasi	0,50	0,52	0,55	0,51	0,02	-0,04
11	Caras-Severin	0,66	0,54	0,54	0,47	-0,13	-0,06
12	Cluj	0,61	0,52	0,55	0,54	-0,09	-0,01
40	Constanta	0,70	0,57	0,52	0,53	-0,13	0,02
13	Covasna	0,51	0,54	0,41	0,48	0,03	0,07
14	Dambovita	0,47	0,55	0,60	0,57	0,09	-0,03
15	Dolj	0,52	0,58	0,49	0,62	0,06	0,13
16	Galati	0,47	0,60	0,54	0,55	0,13	0,00
17	Giurgiu	0,50	0,58	0,45	0,54	0,08	0,09
18	Gorj	0,45	0,59	0,56	0,55	0,14	-0,01
19	Harghita	0,48	0,52	0,46	0,48	0,04	0,01
20	Hunedoara	0,62	0,58	0,54	0,53	-0,04	-0,01
21	Ialomita	0,49	0,56	0,50	0,51	0,07	0,01
22	Iasi	0,60	0,52	0,48	0,63	-0,08	0,14
23	Ilfov	0,44	0,62	0,48	0,48	0,17	0,00
41	Maramures	0,57	0,59	0,53	0,53	0,02	-0,01
24	Mehedinti	0,53	0,61	0,53	0,48	0,08	-0,05
39	Municipiul Bucuresti	0,61	0,45	0,52	0,54	-0,16	0,02
25	Mures	0,55	0,49	0,59	0,57	-0,06	-0,02
26	Neamt	0,62	0,59	0,52	0,54	-0,03	0,02
27	Olt	0,44	0,54	0,51	0,48	0,11	-0,02
28	Prahova	0,51	0,51	0,57	0,56	0,00	-0,01
37	Salaj	0,63	0,56	0,55	0,52	-0,07	-0,03
38	Satu Mare	0,67	0,57	0,52	0,54	-0,10	0,02

29	Sibiu	0,46	0,56	0,54	0,54	0,10	0,00
30	Suceava	0,56	0,56	0,51	0,51	0,00	-0,01
31	Teleorman	0,53	0,53	0,55	0,53	-0,01	-0,03
32	Timis	0,68	0,59	0,49	0,50	-0,09	0,01
33	Tulcea	0,54	0,49	0,51	0,49	-0,05	-0,02
34	Valcea	0,47	0,57	0,53	0,57	0,10	0,04
35	Vaslui	0,50	0,51	0,57	0,56	0,01	-0,01
36	Vrancea	0,49	0,53	0,49	0,48	0,04	-0,01
	<b>min</b>	<b>0,43</b>	<b>0,45</b>	<b>0,41</b>	<b>0,46</b>	<b>-0,16</b>	<b>-0,06</b>
	<b>max</b>	<b>0,70</b>	<b>0,62</b>	<b>0,60</b>	<b>0,63</b>	<b>0,17</b>	<b>0,14</b>



18	Galati	-0,6	2	-0,3	2	5,3	2	40,0	4,8	20,6	-2,4
19	Giurgiu			3,7	3	15,4	4	46,7	10,7	25,2	-3,6
20	Gorj			2,3	2	6,7	3	33,3	9,0	33,5	-4,6
21	Harghita	18,6	3	-0,5	2	13,6	4	60,0	5,9	24,3	-1,5
22	Hunedoara	1,3	2	-1,8	2	18,4	5	60,0	6,1	26,0	-6,4
23	Ialomita			0,3	2	3,2	2	26,7	8,4	23,9	-4,6
24	Iasi	-21,2	1	2,2	2	17,9	5	53,3	7,7	25,5	8,8
25	Ifov			41,2	5	18,2	5	66,7	8,0	50,3	33,6
26	Maramures	12,6	3	7,8	4	14,0	4	73,3	7,8	23,9	-2,1
27	Mehedinti			1,1	2	2,5	2	26,7	4,3	19,5	-6,2
	Municipiul							86,7			
28	Bucuresti	19,6	3	15,1	5	16,7	5	66,7	35,3	88,9	-2,3
29	Mures	36,9	4	4,3	3	11,0	3	66,7	8,5	27,2	-1,6
30	Neamt	-16,7	1	-2,8	1	8,5	3	33,3	5,1	18,2	-3,1
31	Olt			-0,4	2	5,6	2	26,7	7,4	20,8	-7,5
32	Prahova	-0,9	2	7,1	4	16,9	5	73,3	13,5	39,3	-4,2
33	Salaj	31,6	4	3,7	3	7,5	3	66,7	7,9	26,2	-2,9
34	Satu Mare	50,1	5	1,6	2	8,5	3	66,7	7,4	23,8	-1,8
35	Sibiu	-6,2	2	6,1	3	8,9	3	53,3	11,8	38,1	1,4
36	Suceava	17,6	3	2,0	2	13,7	4	60,0	4,4	18,7	2,4
37	Teleorman			1,5	2	11,0	3	33,3	4,1	18,4	-9,7
38	Timis	17,4	3	7,3	4	8,0	3	66,7	15,9	49,1	3,1
39	Tulcea	5,9	2	1,1	2	3,3	2	40,0	8,2	24,5	-5,9
40	Valcea			2,8	3	20,9	5	53,3	6,6	25,4	-3,6
41	Vaslui			2,6	3	7,4	3	40,0	3,9	14,4	4,2
42	Vrancea			1,9	2	4,1	2	26,7	5,9	19,8	-2,8

Source: Authors' own research.