

# **Structure of Economic Activities and Infrastructures as Determinant Factors of Regional Development in Romania**

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## **Abstract**

*The article focuses on the analysis of the extent to which the structure of economic activities and the state of transport, communications, energy and digital infrastructure influence the economic and social development of the NUTS2 regions of Romania. The analysis is carried out in terms of the gross value added generated by the various activities as well as the state of the mentioned infrastructure existing in the regions, the determinants that differentiate them both in their current development and in their prospects of economic and social emancipation.*

**Keywords:** *determinant factor; structure; infrastructure; gross value added; competitiveness.*

**JEL Classification:** *R11*

## **Introduction**

Depending on the resource endowment, but also on other factors, primarily the existing investment capital, the structure of the economic activities carried out in the regions differentiates them, dividing them into more industrialized regions, where the share of manufacturing is significant, and regions where the weights of other activities, primarily agriculture, are higher. The structure of economic activities also explains, to a large extent, the level of development of the regions, where the higher VAB productive activities are more developed and have wider perspectives to develop at a higher pace than the national average.

## **Structure of Economic Activities**

The structure of economic activities varies widely between the development regions of Romania, in five of the eight existing the activity other services is predominant, as shown in the following table.

**Table 1.** Structure of economic activities in the development regions by VAB, 2015 (%)

Economic activities	North-East	South-East	South Muntenia	Bucharest - Ilfov	South-West Oltenia	Center	West	North-West	Romania
Agriculture, forestry, fishing	7,5	8,0	7,7	0,3	7,3	5,1	5,0	5,0	<b>4,8</b>
Mining, manufacturing, energy, hot water, air conditioning	22,1	31,6	37,7	17,6	30,9	34,1	32,4	28,1	<b>27,4</b>
Constructions	6,9	7,9	5,7	7,1	7,8	6,4	4,8	6,6	<b>6,7</b>
Trade, transport, warehouses, repair of motor vehicles and motorcycles	20,1	20,1	17,4	18,8	19,1	19,3	20,5	20,7	<b>19,4</b>
Information and communications	3,3	1,8	1,2	12,7	2,0	3,4	4,5	5,3	<b>5,7</b>
Other services	40,1	30,6	30,3	43,5	32,9	31,7	32,8	34,3	<b>36,0</b>

Source: National Institute of Statistics. Romanian Statistical Yearbook 2017, Table 11.18., Bucharest, 2018.

The Bucharest-Ilfov region, the most developed one, which cannot be compared logically with the other regions due to the appreciable difference that separates them, is a singular case, it is remarkable by the very high share of the activity "Information and communications", intensely intensive in technology and knowledge, thus generating consistent VAB, as well as the higher share of other services; the situation can be explained by the fact that all the central public administration institutions (ministries, agencies, councils, authorities, offices, etc.) are concentrated in the Capital, whose activities are related to this category.

The Center and West regions, developed, have industrial activities with a share well above the national average, the weights of other activities falling within the close limits of this average.

Three regions considered to be less developed - South-East, South Muntenia and South-West Oltenia - have an interesting feature that they have high shares of agricultural activity simultaneously with the high industrial activity, which is a beneficial diversification of the economic activities that provides them encouraging prospects for sustained development; however, the share of "Information and Communication" activity is low, at about one third of the national average, which corresponds to their condition of less developed regions where the assertion of the knowledge-based economy is modest.

The least developed North-East region, with prevailing agrarian character, also includes activities with sufficiently high weights (industry, construction) to provide them with a substantial contribution in perspective to economic growth if, of course, the existing comparative and competitive, existing and potential, advantages that it has will be appropriately capitalized, and the existing opportunities will be exploited.

The picture of the economic activities carried out in the regions demonstrates the "historical" character of the progressive forging of their structure, started in the period before the First World War, continued in the interwar period and in that of the planned economy, and largely maintained, after 1990, in the sense that regions and areas that have since the beginning asserted

their prevailing industrial character have maintained and strengthened it over the decades. This is perceptible not only in terms of the higher share of industrial activities, but also by the high share of other activities that have profound interferences with industry, such as "Information and Communication", which generates high added value, much above that one produced by most other activities.

## **The Activities of the Manufacturing Industry in the Regions**

The manufacturing industry is the main driving force for the economic development of a country and its regions, in that - by incorporating the latest developments in the field of technological progress and relying on methods of organizing production and labor in continuous refinement and improvement -, it diffuses these elements into other economic branches, supporting them to progress and increase their contribution to improving the competitiveness of the whole economy.

The development regions in which the manufacturing industry has a consistent presence are the most economically and socially advanced, the historical heritage of some areas with intense industrial activity allowing them, even in the context of the acute deindustrialization of the Romanian economy after 1990, to cross without disastrous losses during periods of crisis or economic recoil and to preserve their status of advanced regions.

The main manufacturing activities in the development regions are shown in the table below.

**Table 2.** Existing manufacturing activities in development regions

<b>Region</b>	<b>Activities</b>
<b>North-East</b>	Woodworking; furniture; chemistry; textiles and garments. Urban poles of economic and industrial growth - Bacau, Iasi, Suceava
<b>South-East</b>	Petrochemistry (Năvodari); metallurgy (Galati and Tulcea); machine building (Brăila, Buzău, Constanța, Tecuci); shipbuilding and marine drilling platforms (Brăila, Constanța, Galati, Mangalia, Tulcea); construction materials (Medgidia); garments (Braila, Buzau, Focsani); wood processing (Buzău, Vrancea); food industry (Tulcea). Urban poles of economic and industrial growth: Brăila, Constanța, Galati
<b>South Muntenia</b>	Chemistry and petrochemistry (Arges, Prahova); motor vehicles and transport equipment (Argeș, Dâmbovița, Prahova); textiles (Dâmbovița); garments (Prahova); food (most of the component counties). Urban poles of economic and industrial growth: Pitești, Ploiești
<b>Bucharest – Ilfov</b>	Manufacture of basic pharmaceutical products and pharmaceutical preparations; manufacture of rubber and plastic products; machine building and technological equipment; manufacture of computers and electronic and optical products; printing and reproduction of recorded media; information and communication technology. Numerous central institutes, R & D institutes and centers in fields specific to the manufacturing industry
<b>South-West Oltenia</b>	Exploitation and processing of wood (Vâlcea); chemistry (Dolj, Vâlcea); technical rubber articles (Gorj); machine building - agricultural machinery, motor vehicles, locomotive repair and rolling stock (Dolj); metalworking (Vâlcea); electric machines and equipment (Dolj); river shipbuilding (Mehedinti); metal constructions and metal products (Mehedinti); manufacture of freight wagons (Mehedinti); non-ferrous metallurgy - production of aluminum by bauxite electrolysis and its processing in parts and profiles (Olt); manufacture of electric cables, pipes, coal products (Vâlcea); textiles (Gorj, Mehedinti, Olt, Vâlcea); footwear (Vâlcea); food (Gorj, Mehedinți, Olt, Vâlcea); furniture manufacturing (Gorj, Olt). Urban poles of economic and industrial growth: Craiova, Ramnicu-Valcea
<b>Center</b>	Exploitation and processing of wood; chemistry; manufacture of basic pharmaceutical products and pharmaceutical preparations; machine building and metalworking; metallic constructions and metal products; construction materials; textiles; food. Urban poles of economic and industrial growth: Brașov, Sibiu, Târgu-Mureș

Table 2 (cont.)

<b>West</b>	Exploitation and processing of wood; chemistry; manufacture of basic pharmaceutical products and pharmaceutical preparations; machine building; metallic constructions and metal products; manufacture of components and subassemblies; construction materials; textiles; footwear; information and communication technology. Urban poles of economic and industrial growth: Arad, Timișoara
<b>North-West</b>	Food; leather and footwear; exploitation and processing; wearing apparel; non-ferrous metallurgy; metallic and metal products; non-metallic mineral products (concrete, mortar, abrasive products); furniture manufacturing. Urban poles of economic and industrial growth: Baia Mare, Cluj, Oradea

Source: Regional development plans 2014-2020 of Regional Development Agencies

Manufacturing activities are present, in a broader or narrower range, in all development regions, as a major effect, inter alia, of the country's forced industrialization policy and the balanced development policy of production forces on national territory, followed during the centralized economy. What differentiates, however, from this point of view, the more developed regions from the least developed ones is that, in the former, technologically-intensive manufacturing industries (or activities in the NACE horizon), which generate higher added value, are present in high proportions, as well as have a superior contribution to the overall development of the respective regions.

The analysis of Table 2 should be coupled with that of Table 1 on the structure of VABs of economic activities carried out in the regions; the data in the second activity structure table does not individualize the manufacturing industry but associates it with the extractive industry, the production and transport of energy, hot water and air conditioning, which makes it difficult to comparatively analyze the regions because of the distortions introduced by this economic activities grouping practiced in the national official statistics. As a result, a less developed region such as South Muntenia appears with the highest share of the mentioned group of activities, much over the other regions and above the national average, although it also has a high share of agricultural, forestry and fishing activities, which gives it an agrarian-industrial character.

## Infrastructures

Transport, communications, energy, digital infrastructure is a factor that gives regions a highly differentiated location advantage and, as a result, is a convincing argument for attracting domestic and foreign investment capital. Indeed, the existence of dense infrastructures and of modern transport and communications equipment, and some availabilities of energy production, transport and distribution, as well as state-of-the-art digital networks, provide lower costs and tariffs for consumers - businesses, institutions and households - which materializes the location advantages of these infrastructures.

Since there is a wide range of regional information on these infrastructures, we will limit ourselves to the presentation of some of them whose synergy character is of particular relevance.

### a. Transport

#### a.1. Road

The length of public roads at regional level and their density are shown in the following table:

**Table 3.** Length of public roads and their density by development regions, on 31 December 2016

Development region / Indicators	Length of public roads (km)	Density of public roads (km/100 km <sup>2</sup> )
North-East	14830	40,2
South-East	10972	30,7
South Muntenia	12940	37,5
Bucharest – Ilfov	874	48,4
South – West Oltenia	11287	38,6
Center	11458	33,6
West	11041	34,5
North - West	12678	37,1
<b>Romania</b>	<b>86080</b>	<b>36,1</b>

Source: National Institute of Statistics. Romanian Statistical Yearbook 2017, Table 17.18., Bucharest, 2018.

The public roads network is scattered in a sufficiently balanced way across the country so as not to separate, from this point of view, the developed regions of those least developed. For example, the North-East region, which is least developed economically and socially, has the largest length of public roads, representing 17.2% of the length of the national network, and the highest density, with the exception of the Bucharest-Ilfov region which can't be included in the comparison for the reasons shown.

The common feature of all development regions, including Bucharest - Ilfov, is its insufficiency in relation to the requirements of economic activity and social life (there are still many localities away from public roads), the profoundly poor state of roads and the extreme modest density of the network of motorways.

### a.2. Railway

The length of railway lines and their density by development regions is shown in the following table, which highlights the existence of a relatively well-scattered network in the country, with notable reserves of passenger and freight transport volumes, which are drastically diminished by the many dysfunctions mentioned below, with profoundly negative economic and social effects.

**Table 4.** Length of railway lines and their density by development regions, on 31 December 2016

Development region / Indicators	Length of railway lines (km.)	Of which: electrified (km.)	Density of railway lines (km./100 km <sup>2</sup> )
North - East	1621	663	44,0
South - East	1748	522	48,9
South Muntenia	1247	451	36,2
Bucharest – Ilfov	279	259	154,7
Sud - Vest Oltenia	990	507	33,9
Center	1333	666	39,1
West	1888	650	58,9
North - West	1668	312	48,8
<b>Romania</b>	<b>10774</b>	<b>4030</b>	<b>45,2</b>

Source: National Institute of Statistics. Romanian Statistical Yearbook 2017, Table 17.19., Bucharest, 2018.

The territorial distribution of the railway network is such that some less developed regions - North-East and South-East - have railway lengths superior to those in developed regions, for instance the Center region, and the density of these lines close to or above the national average. As for electrified railway lines, the same two regions show a significantly better situation than, for example, the North-West region.

Similar to the situation of public roads, and railway infrastructure shows the same picture: the railways are outdated for the overwhelming majority of their length, having a precarious situation due to the lack for a long period of investments in capital repairs and upgrades, which impose long-distance restrictions of speeds, resulting in a drastic decline in average speed at the national level; the state of rolling stock, locomotives and passenger and freight wagons, is also precarious, presenting numerous risks of injuries and disruptions to the movement and resulting in a reduced commercial fleet utilization rate; there is a frequent lack of inter-modal transport capacities at high-density points of transport routes; automated management systems of railway transport are scarce in many areas, functioning defectively due to lack of upgrading.

The deficiencies of the road and railway network and the serious malfunctions they present affect all development regions, deeply hinders their economic growth and is a strong deterrent to investors willing to place their capital in large-scale regional projects.

### **a.3. River and naval**

This transport infrastructure is, obviously, present in the regions close to the Danube, rivers and waterways, as well as the Black Sea.

In the South - East region, for example, there are 3 seaports and 4 river ports. Constanta Harbor has an advantageous position, being located on the routes of three Pan-European transport corridors (IV, IX and VII - the Danube, connecting the North Sea to the Black Sea through the Rhine-Main-Danube Corridor), is the largest port of containers in the Black Sea and has a major role in the European intermodal transport network, being placed at the intersection of the commercial routes connecting the Central and Eastern European countries with the Near East and Transcaucasus.

The South Muntenia Region flanks the Danube, with 5 river ports and 5 border crossings points with Bulgaria.

There are 5 river ports in the South-West Oltenia region.

In the West region, the Danube is navigable on the Baziaş-Orşova segment, the Mureş River on the Alba Iulia - Arad segment, and the Bega River on 40 km.

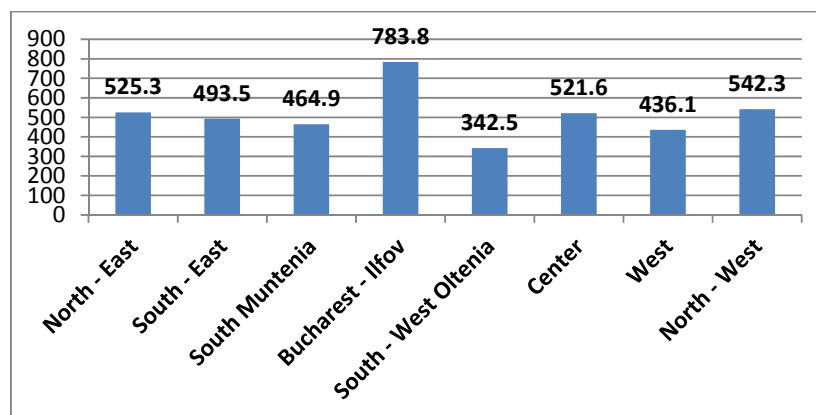
### **a.4. Airline**

The infrastructure includes an appreciable number of airports for domestic and international traffic: the North - East region - 3 international airports; South - East - 1 international airport, 1 charter airport and 2 utility airports; Bucharest - Ilfov - 2 international airports; South-West Oltenia - 1 international airport; Center - 2 international airports; West - 2 international airports and 1 airport for domestic flights; North - West - 4 international airports.

### **a.5. Communications**

In modern society, the communication structure is vital, whereas it ensures the high operational effectiveness and superior efficiency of business, the effectiveness of the activity of public and private institutions, the comfort of the people, in a word, the qualitatively superior development of the life of society.

The backwardness of the communication infrastructure in Romania in the last period of the centralized economy regime has largely been recovered during the transition period and, especially, in the post-transition period. Regional disparities continued to persist in this respect, but not always to the detriment of the less developed regions, as indicated by the Total number of fixed telephony services connections broken down by region and shown in the following figure:



**Fig. 1. Total number of fixed telephony services connections by development regions, 2016 (million)**

Source: National Institute of Statistics. Romanian Statistical Yearbook 2017, Table 17.21., Bucharest, 2018.

The number of fixed telephony services connections, which varies widely between regions, should be related to the number of mobile telephony connections, or the number of mobile phones possessed by the inhabitants of the regions, for these latter two indicators but there are no statistical data.

#### a.6. Energy

The energy resources endowment of regions determines, to a large extent, the structure of production capacities by the types of fuels used: the South-West Oltenia and West regions have coal-fired energy groups, the Center region has hydro and hydropower plants, the North - East and North - West have hydroelectric power plants, and the South-East region is characterized by the high contribution of wind power plants to national energy production (around 1500 Mw), and the presence of the Cernavoda nuclear power plant with an installed power of 1400 Mw; the share of this last region in total nationwide installed power is over 30%.

The distribution of installed power by development regions, presented in the following table, undergoes major changes in 2013-2020, which will deepen regional disparities.

**Table 5.** The installed power of energy groups by development regions, 2013 and 2020 - estimates) (Mw)

	2013		2020	
	Mw	%	Mw	%
<b>North - East</b>	1336,5	6,5	797,9	4,3
<b>South - East</b>	4266	20,9	4266	22,8
<b>South Muntenia</b>	1860	9,1	1860	10,0
<b>Bucharest - Ilfov</b>	1195	5,9	1020	5,5
<b>South - West Oltenia</b>	7760	38,0	7330	39,2
<b>Center</b>	1365	6,7	1165	6,2
<b>West</b>	2022	9,9	1752	9,4
<b>North - East</b>	609	3,0	459	2,5
<b>Romania</b>	<b>20414</b>	<b>100,0</b>	<b>18679</b>	<b>100,0</b>

Source: Processing of existing data on [www.transelectrica.ro](http://www.transelectrica.ro)

The South - East and South - West Oltenia regions, due to their energy group categories, will, according to experts' estimations, hold about 62% of the total installed power in 2020, given that the North-East, Bucharest - Ilfov, Center, West, and North - West regions reduce their share. These structural changes within the National Energy System - NPS will require

significant investments in the expansion and modernization of the electricity transmission networks.

The reduction in installed power across the country in the period 2013-2020 by 8.5% was determined by the significant decrease in energy demand due to the steep decline in industrial consumption (by 2015 industry consumed around 1/3 of the 1990 level), and the decommissioning of an important part of the national irrigation system (energy consumption of agriculture had a share in the final energy consumption of 5.3% in 1989 and 2.1% in 2015).

### a.7. Digital

The digital infrastructure has undergone a process of profound transformation since 1990, similar to that shown in the communication infrastructure. Following the precarious situation in the first years of the transition, the subsequent progress was rapid and spectacular, bringing the condition of the development regions in Romania close to that of the NUTS2 regions of other European Union countries. Large disparities continue to exist both between the regions of Romania and between them and those of other regions in the community space, as shown by the dynamics of the level of some indicators presented in the following table:

**Table 6.** The level of relevant indicators for digital infrastructure in development regions (%)

	Year	North -East	South -East	South Mun- tenia	Bu- charest- Ilfov	South- West Oltenia	Center	West	North -West	Romania
Share of households with internet access from home	2010	36	39	36	67	35	40	47	42	<b>42</b>
	2018	74	73	76	96	81	78	86	87	<b>81</b>
The share of people who use the Internet for interaction with public authorities	2011	6	7	5	13	11	6	5	7	<b>7</b>
	2018	7	3	11	13	9	11	9	12	<b>9</b>
Share of people accessing the Internet away from home and work	2012	7	8	5	16	3	7	8	6	<b>7</b>
	2018	46	49	57	78	61	47	63	62	<b>58</b>

*Source:* EUROSTAT. Households with access to internet at home, Code [isoc\_r\_iacc\_h]; Individuals who used the internet for interaction with public authorities, Code [isoc\_r\_gov\_i]; Individuals who accessed the internet away from home and work, Code [isoc\_r\_iumd\_i]

The progresses registered during the period 2010-2018, a relatively short one, highlighted by the figures in the previous table, are appreciable, being recorded both by the developed and the least developed regions in terms of economic development: the share of the number of households with access the Internet has doubled, including in most less developed regions, and the possibilities of accessing the Internet from different territorial dispersed points have multiplied more than eight times in three regions and at national level. Despite the progress, the differences in the level of the indicators analyzed at national scale and in the industrialized countries of the European Union continue to be significant.



## Conclusions

The range of factors influencing and determining the level of regional development, largely dependent on the competitiveness of the economic activities taking place in the region's perimeter, is broad, in line with the wide range of factors - economic, social and psycho-social, technical and technological, political, legislative-regulatory, geo-political, ecological. The main determinants of high industrial development have a very intense influence on regional competitiveness and development; the availability of data and factual elements necessary for their analysis is, however, inadequate in the national official statistics and EUROSTAT, especially in the manufacturing sector, which makes it difficult to deepen the analysis of the state of these factors and their influence on competitiveness and regional development.

Sensitive variations in the structure of economic activities and the state of infrastructure exist not only between regions but also within them, between counties. In all regions there are counties with intensive economic activity, concentrated mining and / or processing industry, as well as dense infrastructures, more or less upgraded, alongside counties where the condition of these factors is deficient and places them in a lower position than the others.

In all regions, the more intense or lower presence of the manufacturing industry proves to be a determining factor of the first order of development, both through its own performance - the value of the output, the produced VAB, the share in the value of the regional export, etc. - and through the strong driving effect it exerts on other economic activities, to which it transmits technological and organizational know-how, in which it determines the emergence of new enterprises, etc.

Infrastructures also differ significantly in terms of their state between development regions, their density and degree of modernization varying widely and being in line with the status of developed or with more or less deficient development regions

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