The Regional Smart Specialization Strategy (RIS3) for the South-East Region 2021-2027

Agenţia pentru Dezvoltare Regională
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Acronyms

CAI	Comparative Advantage Index
CANE	Classification of Activities in the National Economy
CIF	Cost, Insurance, Freight
CN	Combined Nomenclature
CPI	Competitive Potential Index
DFI	Direct Foreign Investment
EEOP	Education and Employment Operational Programme
ERDF	European Regional Development Fund
EU	European Union
FOB	Free on Board / Liber la bord
FTOP	Fair Transition Operational Programme
GDP	Gross Domestic Product
GVA	Gross Value Added
ICT	Information and Communications Technology
IGDFIOP	Intelligent Growth, Digitization and Financial Instruments Operational Programme
NABSP	Nomenclature for analysis and comparison of budgets and scientific programs
NASRI	National Authority for Scientific Research and Innovation
NBR	National Bank of Romania
NIS	National Institute of Statistics
NP	National Programme
NPRTDI	National Plan for Research, Technological Development and Innovation
OECD	Organization for Economic Cooperation and Development
PPP	Purchasing Power Parity

PPS	Purchasing Power Standard
RDA	Regional Development Agency
RDI	Research Development Innovation
RIC	Regional Innovation Consortium
RIS3	Regional Smart Specialization Strategy
RIS3 SE	Regional Smart Specialization Strategy for the South-East Region
ROP	Regional Operational Programme
SEO	Social Economy Organizations
SME	Small and Medium Enterprises
SOIT	State Office for Inventions and Trademarks
TAOP	Technical Assistance Operational Programm

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Introduction

The purpose of the Strategy

According to the information published by the European Commission, the regional research and innovation strategies for smart specialization (RIS3 strategies) are integrated agendas based on an "on-the-field" analysis of a region's economic transformation, typically characterized by five main actions[1]:

- Focuses policy support and investment on key national/regional priorities, challenges and needs and is aimed at knowledge-based development.
- It is based on the individual strengths, competitive advantages and the potential of excellence of each country/region.
- Supports technological innovation as well as innovation on a practical basis and aims to stimulate investments from private sector.
- Supports the full involvement of stakeholders and encourages innovation and experimentation.
- Are evidence-based and include robust monitoring and evaluation systems.

Increased investment in research, innovation and the development of entrepreneurship is one of the milestones set in the Europe 2020 Strategy, which pursues a strategic and integrated approach to innovation in order to maximize the potential for research and development at territorial level.

The Guide on Research and Innovation Strategies for Smart Specialization (RIS3) states that adopting an integrated and strategic approach in the innovation field is a key factor in maximizing the potential for research and innovation at European, national and regional levels. Smart specialization is based on the concept of "entrepreneurial discovery", which is a participatory process of identifying, at regional level, key areas of competitiveness, which have potential in terms of development, innovation and added value creation.

RIS3 focuses its economic development efforts and investments on the relative benefits of each region, exploiting economic opportunities and emerging trends and acting to stimulate economic growth. RIS3 increases the added value, impact and visibility of EU funding. Such strategies ensure efficiency in spending money even in periods of budgetary constraints and (more) limited public resources. RIS3 ensures synergies between policies and funding at European level, complementing national and regional schemes and private sector investment. The creation of a Research and Innovation Strategy

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[1] https://ec.europa.eu/regional_policy/sources/docgener/informat/2014/smart_specialisation_ro.pdf

for Smart Specialization for the South-East development region of Romania is not only necessary, but it is the most effective way to improve the benefits in terms of research, development and innovation.

Within this context, the South-East Regional Development Agency, as a non-governmental body of public utility that works in the field of regional development, proposed to update the region's RIS3 strategy for the 2021-2027 programming period. The main objective of this strategy is to substantiate the strategic planning process regarding the development of the South-East Region for the 2021-2027 programming period, by updating and reviewing the statistical information included in the socio-economic analysis of the region in the last 6 years, with focus on the best performing economic sectors at regional level, mapping the relevant regional actors in research and innovation, continuing the process of entrepreneurial discovery (EDP). The results of the present study will substantiate the elaboration of the public policy lines related to the 2021-2027 programming period and will be correlated with the results of other strategic planning processes that are carried out in parallel at European, national and regional level.

In terms of methodology used for drafting the study, in order to obtain conclusions and recommendations that reflect the "on-the-field" reality, an optimal mix of analysis methods and techniques was used, based on the careful use of the "triangulation" principle for three types of methodological tools: (a) Methods of data/information collection; (b) Methods of quantitative analysis and (c) Qualitative analysis tools. Furthermore, the research activities and the elaboration of the study took into account the observance of the provisions contained in the Guide on Research and Innovation Strategies for Smart Specialization (RIS3), endorsed at the level of the European Union.

A series of documents relevant to the current and future development context of the South-East region were analysed, from the perspective of the regional smart specialization desideratum. Concerning the statistical information, the aim was to collect data at the lowest level of aggregation – local (where possible), in order to increase the relevance of the analysis performed in relation the regional specifics.

Chapter I. The analysis of the regional context and of the innovation potential of the South-East Region

This chapter aims to make an in-depth analysis of the socio-economic context of the region. In carrying out this analysis, a series of relevant macro and micro-economic indicators will be analyzed in order to evaluate the existing assets and the development perspectives of the region.

In order to characterize the South-East Region, it is necessary to analyze the regional economic performance based on indicators such as: regional gross domestic product, regional gross domestic product per capita, gross value added by sectors. Based on the analysis of economic indicators, it resulted that the South-East Region registered in the reference period 2014-2020 mainly a positive evolution, although it is below the national average.

I.1. Regional assets – technological infrastructures

a) The economic context

In order to outline an overview of the economic context that characterizes the South-East Region, in this section is presented a comprehensive analysis of the level of socio-economic development of the region, which highlights the position of the region in relation to other development regions and on the basis of which a first set of competitive advantages will be identified. In this regard, the analysis of regional economic performance is based on indicators such as: regional gross domestic product, regional gross domestic product per capita, gross value added by sectors.

Regional GDP

At the level of the South-East Development Region, the value of the Gross Domestic Product (GDP), expressed in millions of lei, was 87,914.5 million lei in 2017, representing 10.26% of Romania's GDP and 0.12% of EU28 GDP.

The analysis of the statistical data provided by the National Institute of Statistics highlights the fact that in the period 2014-2017, the gross domestic product at the level of the South-East Region experienced an upward trend, registering an increase of 14.33% during this period. The highest year-on-year increase was recorded in the period 2016-2017, when the gross domestic product in the South-East Region registered an increase of 9.14 percentage points. This positive dynamic coincides with the trend at both national and European level and can be explained by the phenomenon of incremental growth of the world economy.

Figure no. 1. Evolution of the Gross Domestic Product of the South-East Region in the period 2014-2017
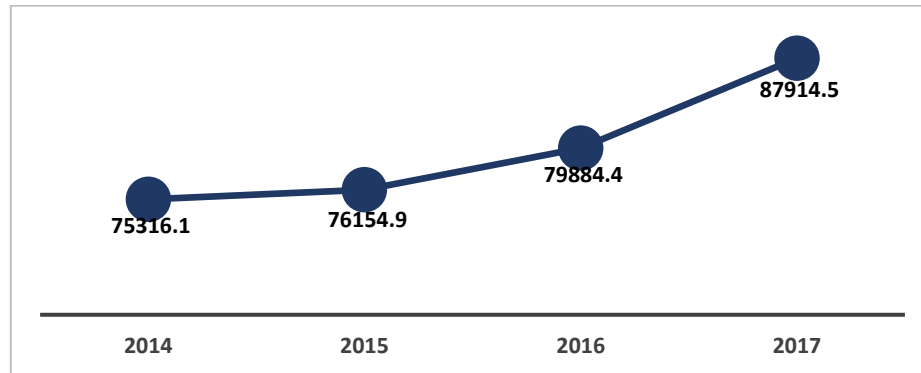
Source: Data processing - National Institute of Statistics 2020

However, the national economy has grown at a faster pace than the economy of the South East Region. This trend can be observed following the dynamics of GDP evolution of the South-East Region as a percentage of National GDP. If in 2014, the economy of the South-East Development Region accounted for 11.26% of the national economy, this share decreased to 10.26% in 2017. Consequently, although the South-East Region enjoyed a significant economic growth in 2014-2017 period, the share of the region's gross domestic product in national GDP decreased by 1 percentage point in the same period.

Figure no. 2. Evolution of the Gross Domestic Product of the South-East Region as% of National GDP
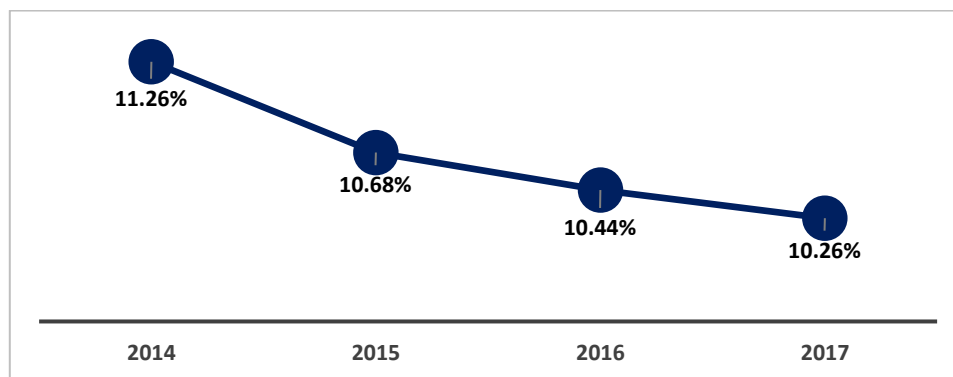
Source: Data processing - National Institute of Statistics 2020

The comparative analysis of the data, at the level of development regions, indicates the existence of significant disparities. Thus, the South-East Region ranks 6th in terms of regional GDP, the level recorded in 2017 being 2.6 times lower than the value of GDP in the Bucharest-Ilfov Region, the most

developed of the eight regions of the country. Thus, a slowdown in the GDP growth of the South-East Region compared to the Central and North-East Development Regions can be observed. If in 2014, the South-East Region was on the 4th place at national level in terms of GDP, it was surpassed, in 2017, by the two development regions mentioned above.

Figure no. 3. Evolution of the Gross Domestic Product at the level of the development regions of Romania, 2014-2017
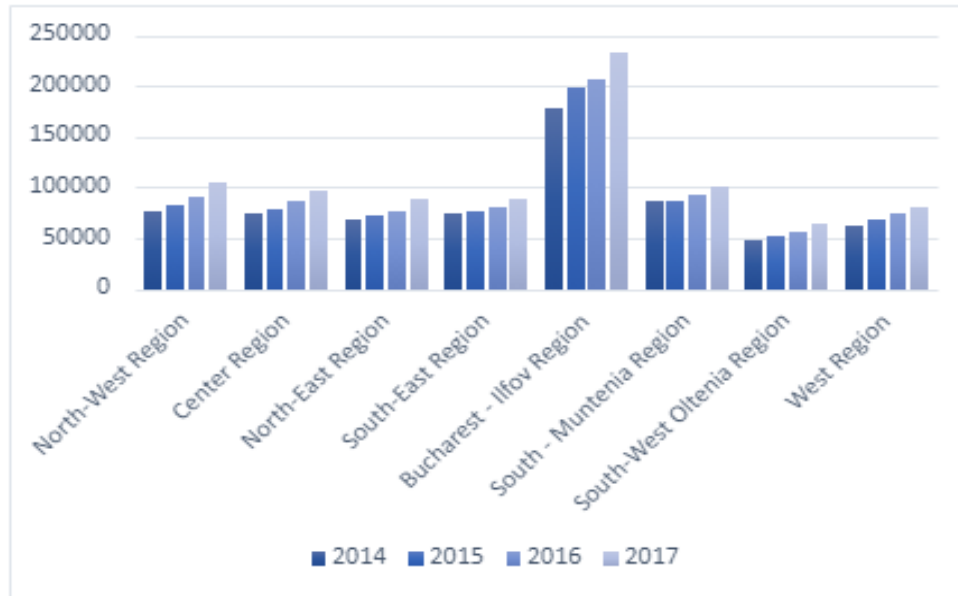
Source: Data processing - National Institute of Statistics 2020

At county level, the highest value of Gross Domestic Product was registered in Constanța County, with a share of regional GDP of 41%, followed at a significant distance by Galati and Buzau counties, with 17 and 13 percentage points, in 2017. At the opposite pole, Tulcea and Vrancea counties recorded the lowest values of GDP, with a share of only 8% and 10% of GDP in the South-East Region for 2017. However, at all of the six component counties of the South-East Region, it is noted that the value of GDP has evolved positively during the analyzed period.

Figure no. 4. Gross Domestic Product of counties related to the South-East Development Region, as a share of regional GDP, 2017
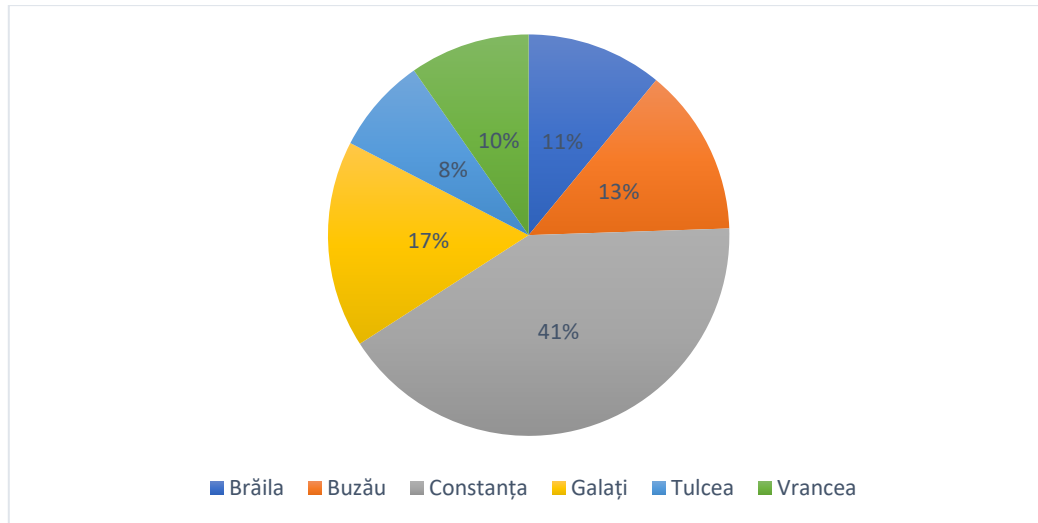
Source: Data processing - National Institute of Statistics 2020

Analysing the evolution of the indicator in the period 2014 - 2017, it is found that Brăila County registered the largest increase in the value of gross domestic product (of 1.31 times), followed by Tulcea and Vrancea counties (increase of 1.29 times, respectively 1.26 times).

Figure no. 5. GDP evolution at the level of counties related to the South-East development region, 2014-2017

Source: Data processing - National Institute of Statistics 2020

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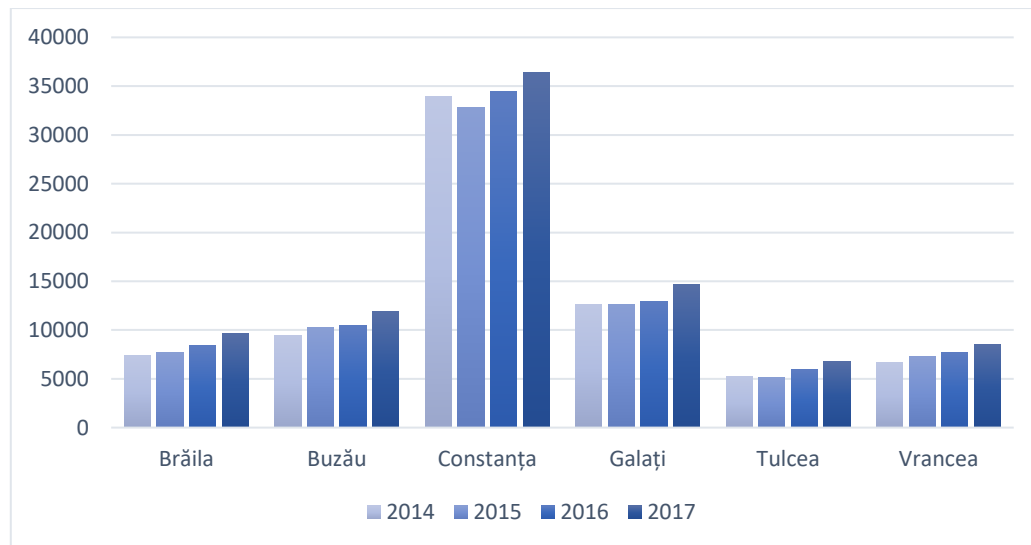
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Regional GDP / capita

The South-East Development Region, occupied, at the level of 2017, the fifth position in terms of the value of the regional gross domestic product / capita of the national average, being overtaken by the Bucharest-Ilfov, West, Center and North-West Regions. Although in 2014, the South-East Region was on the 4th place at national level in terms of GDP / capita, it was overtaken in 2017 by the North-West Region. The value of regional GDP / capita registered at the level of the South-East Region was 82.45% of the national average value of GDP / capita in 2017, registering a decrease of 6.3% compared to 2015 and a slowing down in the growth of the regional economy in relation to the national economy.

Figure no. 6. Evolution of GDP / capita by development regions (lei)
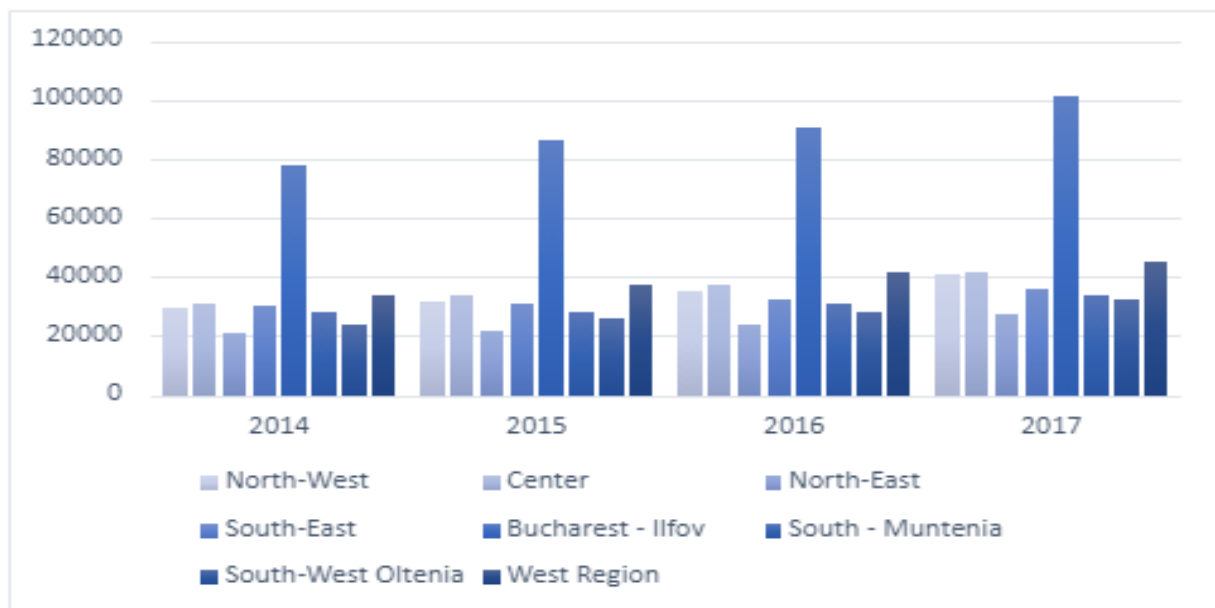
Source: Data processing - National Institute of Statistics 2020

However, as can be seen in the figures below, the value of gross domestic product / capita at regional level registered a positive dynamic in the period 2014-2017, which coincides with the evolutions observed at national and European level. Also, the highest growth of GDP / inhabitant in the South-East Region from one year to another was registered in the period 2016 - 2017, with a percentage growth rate of 10.03%.

Figure no. 7. GDP/capita, at the level of EU 28 (EUR)
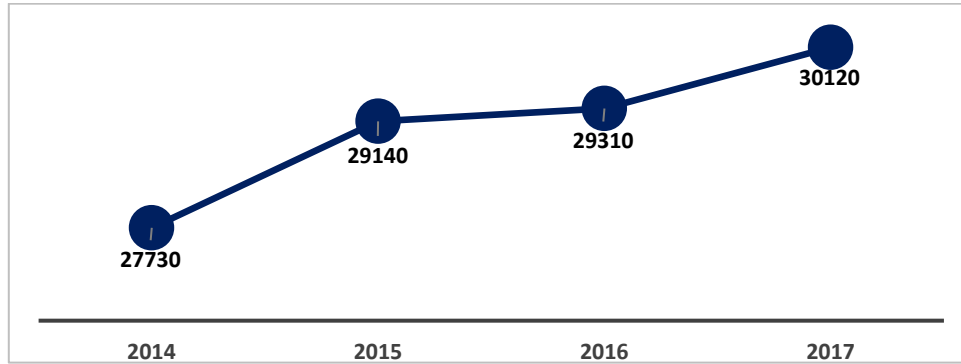
Source: Data processing - EUROSTAT 2020

Figure no. 8. GDP/capita at national level (lei)
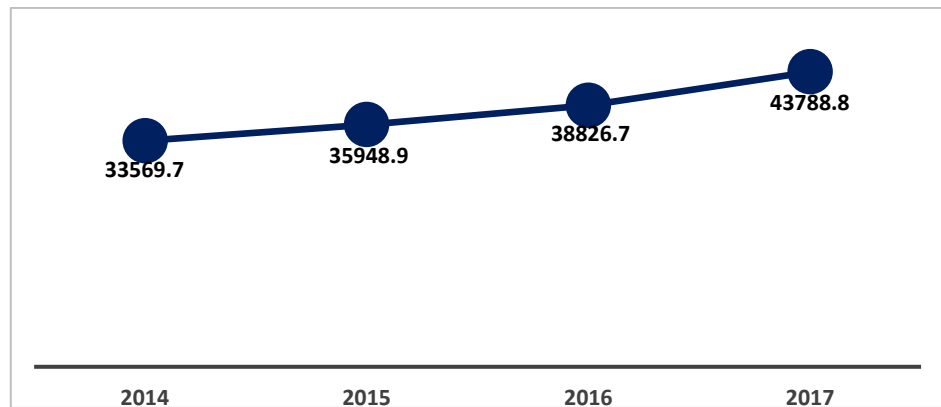
Source: Data processing - EUROSTAT 2020

Figure no. 9. GDP / capita at the level of the South-East Region (lei)

Source: Data processing - National Institute of Statistics 2020

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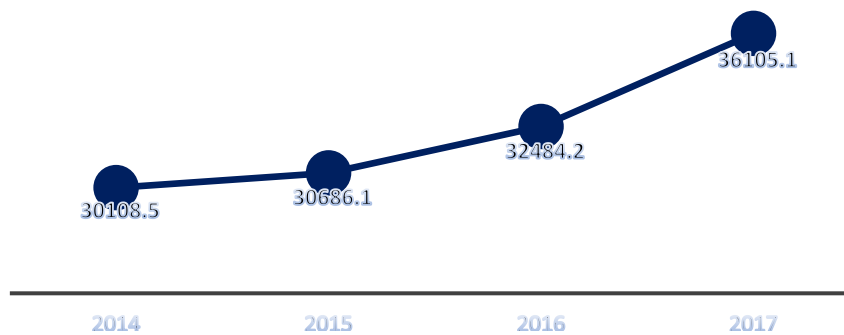
Gross value added

The gross value added (GVA) represents the balance of the production account and is measured as the difference between the value of goods and services produced (valued at basic prices) and intermediate consumption (valued at buyer's prices), thus representing the value newly created in the production process. GVA is calculated before fixed capital consumption is calculated.

At EU-27 level (excluding the United Kingdom of Great Britain and Northern Ireland), the average Gross Value Added increased steadily between 2014 and 2019. The economic performance of the European Union remains clearly superior to Romania, including in terms of the evolution of the GVA index. VAB. If in 2014, at European level there was an average GVA of 10,557,327 million Euros, it increased, in 2019, to 12,471,307 million Euros. Thus, in the period 2014-2019, the average GVA of the European Union increased by 1,913,980 million Euros (average increase of 318,997 million EUR per year).

Figure no. 10. Evolution of GVA at EU 27 level, million Euros
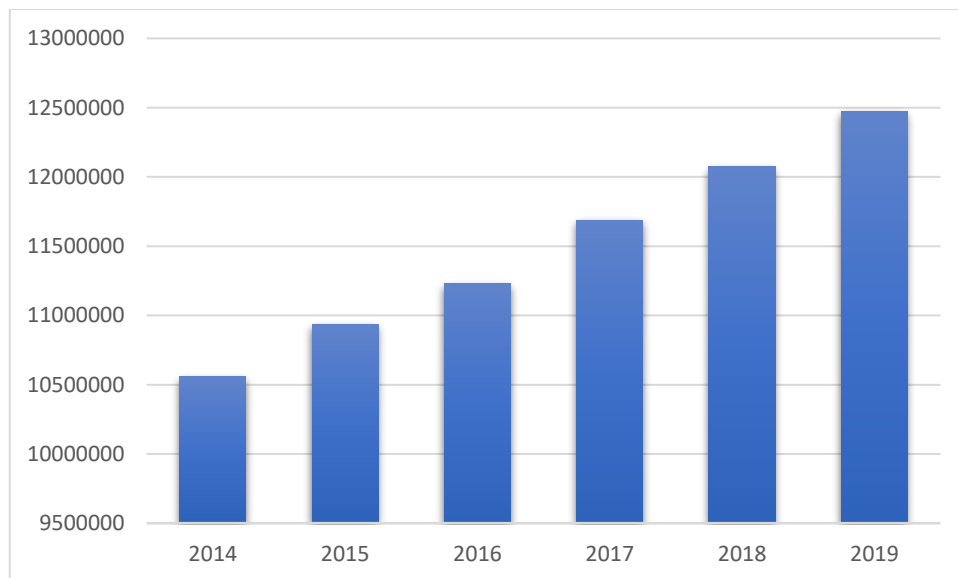
Source: Data processing - EUROSTAT 2020

The evolution of GVA at the level of the South-East Region showed an upward trend in the period 2013-2017, increasing from 63,126.5 million lei to 79,563.8 million lei, representing an increase of 20.66% in a period of 5 years (average growth of 5% per year). However, the South East Region recorded a decrease in the share of national GVA at the same period. If at the level of 2013, the GVA at the level of the South-East Region represented 11.26% of the national GVA, this share registered the lowest value

from the analyzed period, at the level of 2016, when the share of regional GVA in national GVA had decreased to only 9.22%. However, at the level of 2017, a restoration of the growth trend can be observed. Although at the level of 2017, the share of GVA of the South-East Region in the national GVA was 10.24%, it registered a decrease of just over 1 percentage point compared to the value recorded in 2013.

Figure no. 11. GVA evolution at the level of the South-East Region, millions of lei
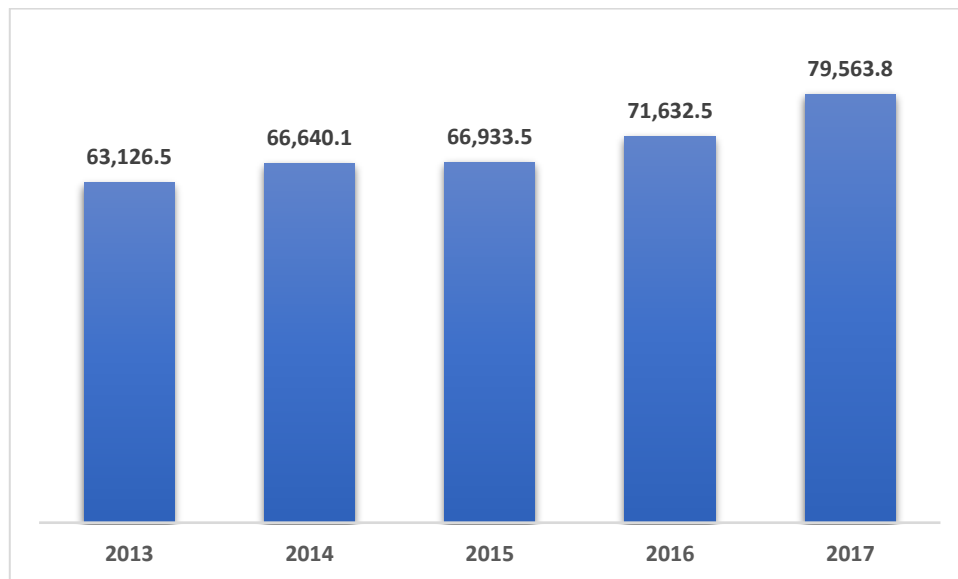
Source: Data processing - EUROSTAT 2020

As shown in the figure below, the South-East Region has grown at a rate similar to the rest of Romania's development regions. An important aspect to mention is the fact that the South-East Region has been outperformed, in recent years, by the North-East, North-West and Centre Regions in terms of the values recorded at the level of the GVA index. This indicates that, although in 2013, the South-East Region had a high degree of economic competitiveness, this degree of competitiveness has steadily decreased in relation to other regions with similar economic performance. The Bucharest-Ilfov development region remains the most developed region of Romania, reaching a GVA of over 210,000 million lei in 2017.

Figure no. 12. GVA evolution, by development regions, 2013-2017, million lei
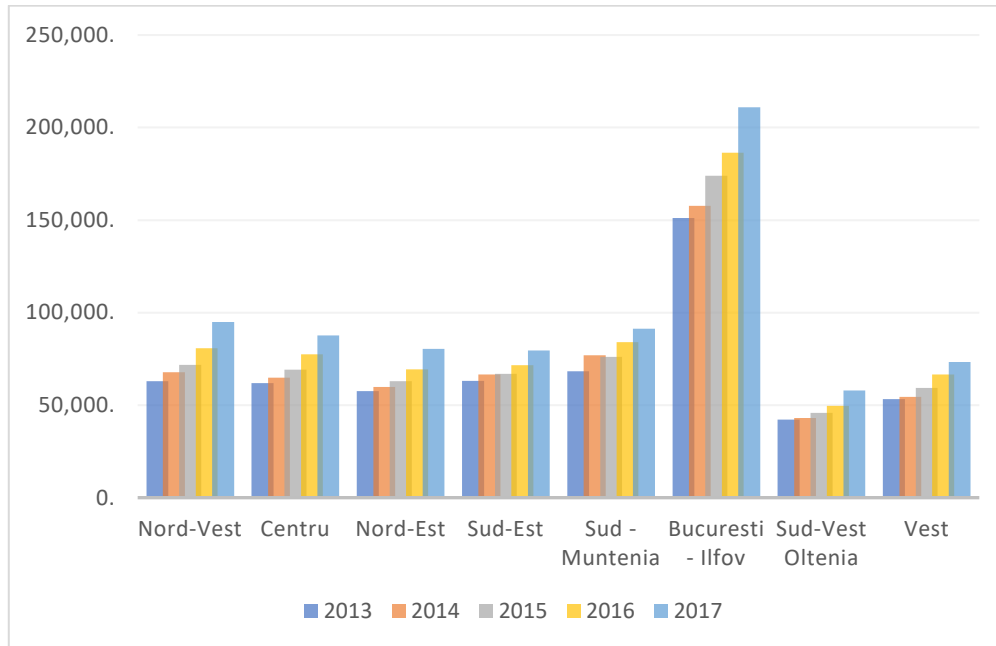
Source: Data processing - EUROSTAT 2020

Regarding the situation at county level, at the level of the South-East Region, Constanța County registers the most significant evolution in the analyzed period. The trend of the indicator is an increasing one, from 26,867.3 million lei at the level of 2013, to 32,991 million lei at the level of 2017, thus registering an increase of 18.53%. The factors that contribute to this positive trend in Constanța county include the existence of a highly developed economic sector, the increase in the activity of local companies, as well as the creation of new local units active at county level, in the period 2013-2017. Tulcea remains the county that registers the lowest values of the indicator among the component counties of the region, aspect generated by the characteristics of this county, which although large, has features that restrict economic activity to a small area compared to other counties.

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2014-2020

Figure no. 13. Evolution of GVA, by counties, 2013-2017, million lei
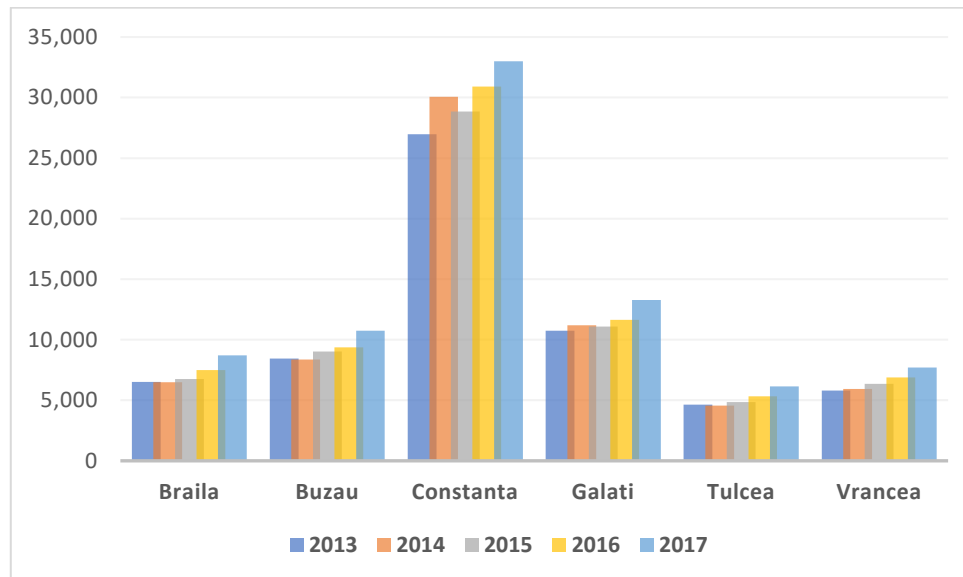
Source: Data processing - EUROSTAT 2020

GVA by sectors

At the level of 2017, the sector with the largest contribution to the formation of GVA at national level was industry (except for the manufacturing and construction industries), with a GVA of 203,615.8 million lei. The manufacturing industry also has a significant contribution, contributing with 17.56% to the national GVA. At the opposite pole is the arts, entertainment and recreational activities sector with 2.7% of the national GVA.

At the level of the national economy, the South-East Region stands out through the gross value added of two economic sectors. Thus, the Region stands out through the level of GVA registered in the agriculture, forestry and fishing sector, with 6,701.3 million GVA lei (the second region at national level), being surpassed only by the South-Muntenia Region, with a marginal advantage. Also, the South-East Region ranks 3rd nationally in the construction sector with 5,229.8 million lei GVA, far from the Bucharest-Ilfov Region and marginally outperformed by the North-West Region, with a disadvantage of 20 million lei GVA. In 2017, the South-East Region contributed with 10.42% of the total national GVA.

Figure no. 14. Regional GVA by sectors, 2017, million lei

Legend:

A - Agriculture, forestry and fishing;

B-E – Industry (excluding construction and manufacturing);

C – Manufacturing industry;

F - Construction;

G-I – Wholesale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants;

J – Information and communications;

K – Financial intermediation and insurance;

L – Real estate transactions;

M-N – Professional, scientific and technical activities; administrative service activities and support service activities;

O-Q – Public administration and defense; social insurance in the public system; education; health and social assistance;

R – Entertainment, cultural and recreational activities; other activities and services.

Source: Data processing - EUROSTAT 2020

At county level, the most significant contribution in terms of GVA is of Constanța County, a long way from Galati County, which is on 2nd place. Altough Constanta is leaer in almost all anlysed economic sectors, in what concerns agriculture, forestry and fishing, the leader at regional level is Brăila county, with a contribution of 1,389.7 million lei. The leading position of Constanța County in terms of GVA at regional level is due to the existence of road and sea connections with other cities in the country and with other European cities, which increase the attractiveness of the county to attract foreign investment.

Figure no. 15. County GVA by sectors, 2017, million lei

Legend:

A - Agriculture, forestry and fishing;

B-E – Industry (excluding construction and manufacturing);

C – Manufacturing industry;

F - Construction;

G-I – Wholesale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants;

J – Information and communications;

K – Financial intermediation and insurance;

L – Real estate transactions;

M-N – Professional, scientific and technical activities; administrative service activities and support service activities;
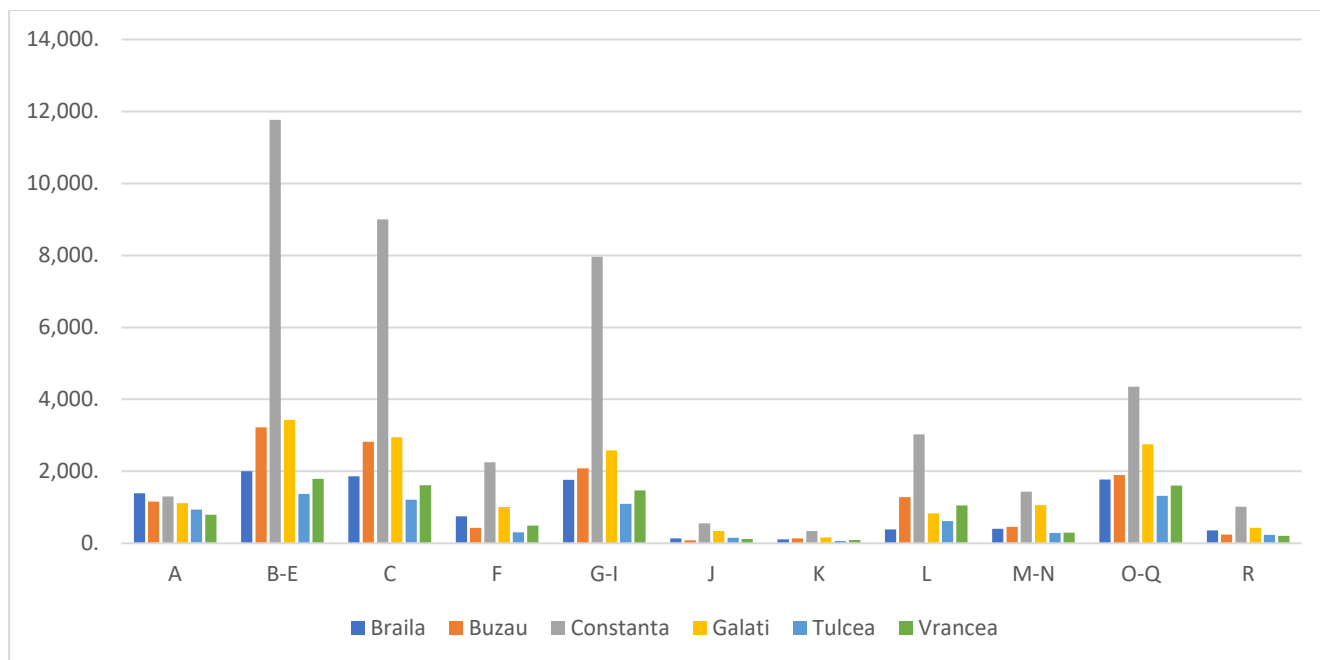
O-Q – Public administration and defense; social insurance in the public system; education; health and social assistance;

R – Entertainment, cultural and recreational activities; other activities and services.

Source: Data processing - EUROSTAT 2020

Labour force in the South-East Region

The process of economic development is based on four essential components, regardless of the development level that characterize a state at a given time, namely:

- Human resource (job offer, education, etc);
- Natural resources (soil, minerals, fuels, environmental quality);
- Technical capital (equipment, factories, roads etc);
- Technology (science, engineering, management, entrepreneurship).

In this regard, the development of an in-depth analysis of the labour force in the South-East Region is necessary to understand on the one hand the potential for economic development, the degree of economic attractiveness of the region, as well as the level of economic and social development and, on the other hand, to understand the impact of labour dynamics on labour productivity and investment attractiveness.

From a methodological point of view, the analysis of the labour market phenomena elaborated within the present strategy followed the methodological specifications of the Romanian National Institute of Statistics[2]. Thus, among the indicators analysed are the occupancy rate, the employment rate, the active population, the activity rate of the population, the level of training, the number of employees etc.

To understand the current dynamics of the labour force[3], firstly it was needed to elaborate an analysis of the existing labour resources at national, regional and counties level. Hence, in 2019, the labour resources at national level amounted 12.1 million people, from which 1.4 million people were placed in the South-East Region (representing 12% from the total at national level). Most of the labour forces from the South-East Region were concentrated in Constanta County (431 thousand people), while the smallest part of the labour forces was concentrated in Tulcea County, namely 118 thousand people.

At regional level, the active population (employed population and registered unemployed) accounted 956 thousand people, resulting in an activity rate of 67.7%, which place the South - East region on the 5th place, after the South-West Oltenia Region (69.2%).

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[2] Two sets of statistical data were used: (1) Labor balance and (2) Household labor force survey
[3] Labor resources include the working age population, able to work, as well as people under and over the working age in activity

Figure no. 16. Labour resources and employed population of the South-East Region, (MU millions of people)
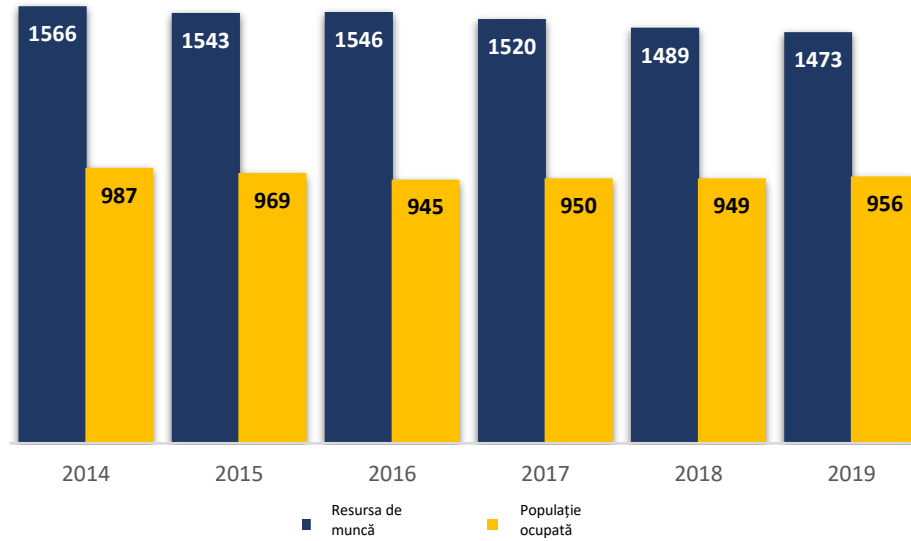
Source: Data processing - National Institute of Statistics 2020

Starting from the presentation of the general situation of the previously detailed labor resource, in the following will be carried out an in-depth analysis of the indicators that present the labor force dynamics.

Thus, a first indicator that will help to measure the trend of the labour market in the South-East Region is **the active population** [4].

The active civil population at national level, registered in 2019 the value of 8,750.5 thousand persons, being decreasing compared to 2014 (8.910 thousand persons), but increasing compared to 2018 when it registered 8,696.4 thousand persons.

At regional level, in 2019, the South-East Region occupied the fifth position in the national ranking of the civil active population, with a value of 997.8 thousand people, being hierarchically superior to the South-West Oltenia Region, which registered the value of 825.9 thousand people and the West Region which registered the value of 840.6 thousand people. The active population of the South-East Region experienced a decrease between 2014 and 2019, from 1059.6 thousand people in 2014 to 997.8 thousand people in 2019 (representing a decrease of 5.8 percentage points).

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[4] The active civil population includes the employed population and the unemployed.

Figure no. 17. Civil active population by development regions (2014 - 2019), (MU thousand people)

Year	North-West	Center	North-East	South East	South Muntenia	Bucharest-Ilfov	South-West	West
2014	1232.4	1086.7	1263.1	1059.6	1236.3	1278.6	886.7	866.6
2015	1217	1076.9	1227.2	1037.9	1196.9	1297.8	858	865.1
2016	1207	1083.9	1194.3	1012.7	1170	1380.9	830.4	856.6
2017	1213.5	1082.8	1190.6	1006.1	1159.9	1388.2	827.7	849.1
2018	1210.3	1082.6	1192.4	995.4	1153.9	1390.1	826.9	844.8
2019	1217.7	1084.3	1194.9	997.8	1148.3	1441	825.9	840.6
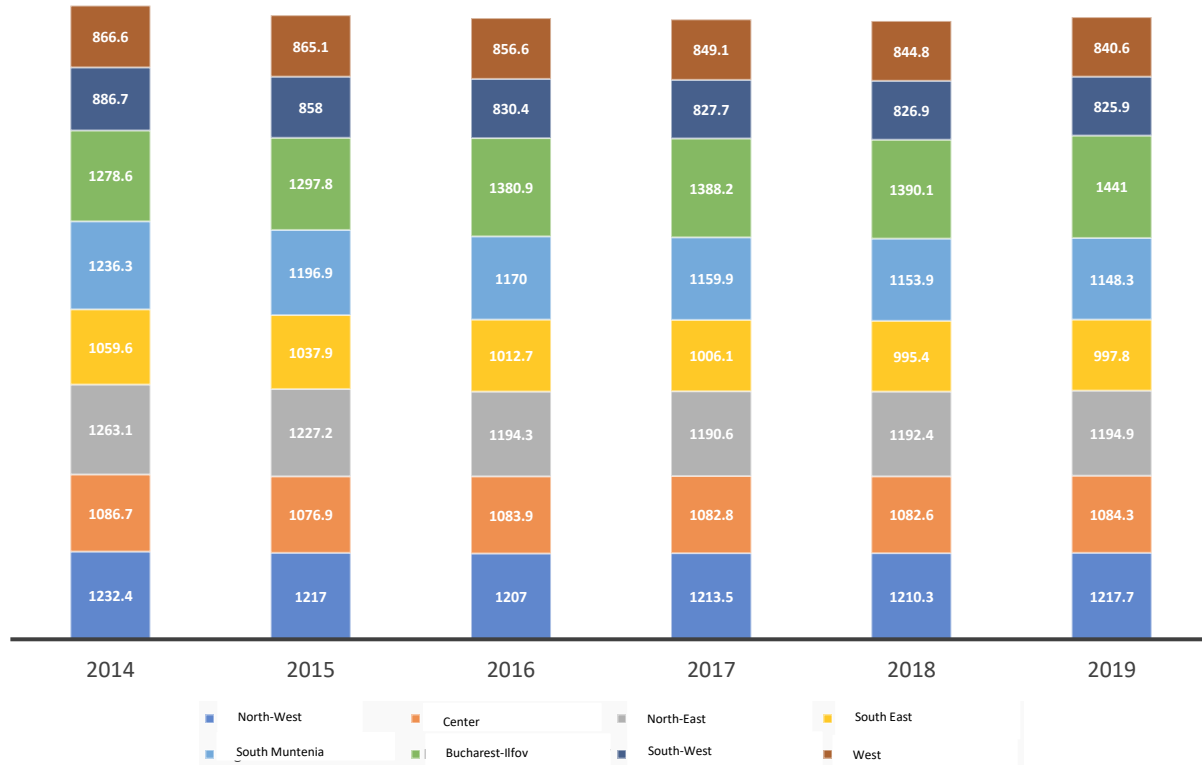
Source: Data processing - National Institute of Statistics 2020

At county level, in 2019, the highest value of the civil active population indicator was registered in Constanța County (294.7 thousand people), having a value of approximately 3.5 times higher than Tulcea County (82.8 thousand people). From a temporal perspective, all six counties of the South-East Region registered a downward trend in terms of the civil active population.

Figure no. 18. Civil active population by counties of the South-East Region (2014-2019), (MU thousands of people)
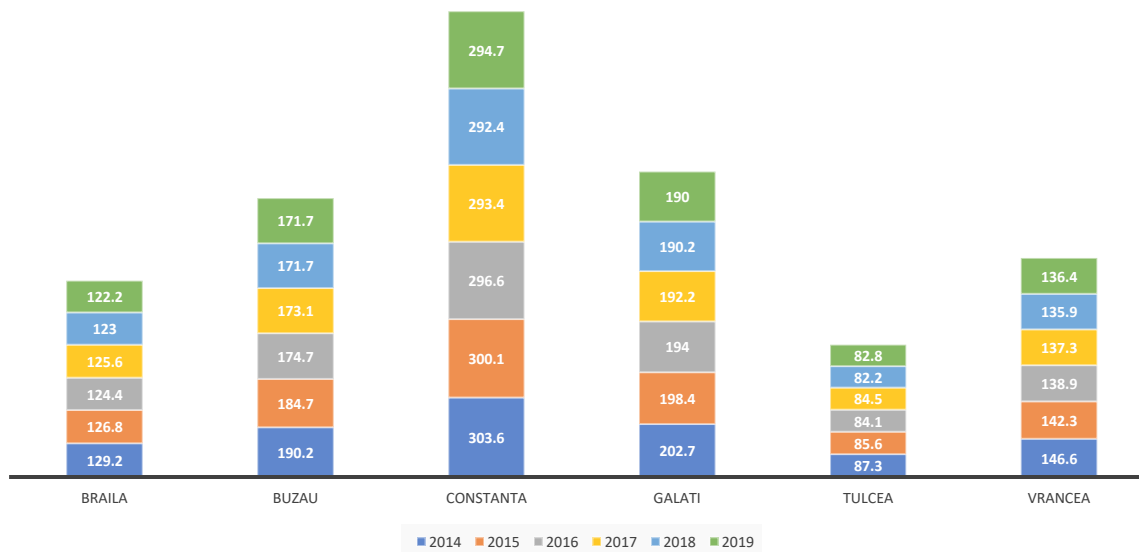
Source: Data processing - National Institute of Statistics 2020

Regarding the division by sex of the civil active population in the region, the female population represented in 2019 45% of the total, and the male population the remaining 55%. The number of active males decreased from 569.1 thousand people (2014) to 546.1 thousand people (2019), and the number of females from 490.5 thousand people in 2014 to 451.7 thousands of people in 2019.

Observing the trends of the civili active population in the reference period 2014 - 2018, an analysis of the **labor force activity rate by regions and counties** can be made[5]. Thus, the evolution of the activity rate of the population aged 15 and over, by sex, in the period 2014 - 2018 is presented according to the data in the graphs below.

At national level, the activity rate in 2019 was 71.7%, and the gender breakdown indicated a percentage of 74% for the male population and a percentage of 69.3% for the female population. Moreover, according to the figure below, a homogeneity can be observed at the level of the reference period, the activity rate at national level not registering significant increases or decreases. Smaller differences are

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[5] The activity rate represents the ratio between the active population and the total population aged 15-64, expressed as a percentage

obtained following the calculation of the indicator by areas: 55.8% in urban areas and 54.3% in rural areas.

Figure no. 19. National activity rate (2014-2019), (MU %)
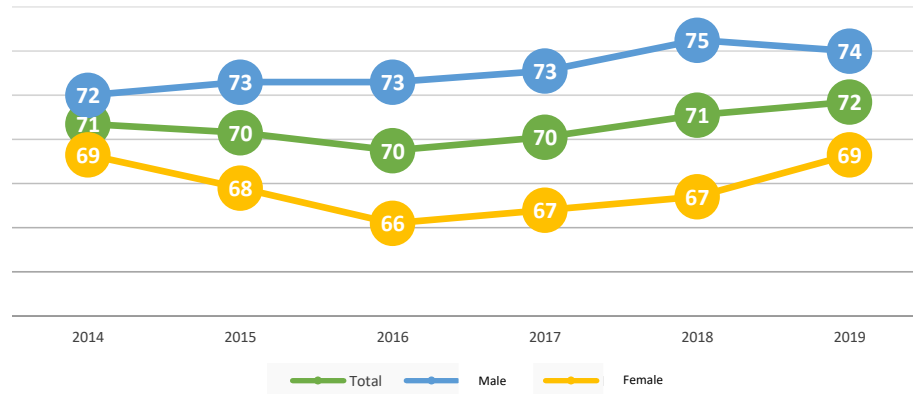
Source: Data processing - National Institute of Statistics 2020

In 2019, at regional level, the North-East Region recorded the highest rate (62.6%), while at the level of the South-East Region, the rate was 50.9%. Regarding the gender breakdown, the highest rate for both females and males was also recorded in the North-East Region, 71.4% for males and 54.1% for females.

In the South-East Region, the gender breakdown indicates a rate of 63.3% for males and 39.2% for females. In 2019, the activity rate registered at the level of the South-East region a slightly ascending trend in the analysed period, increasing from 63% in 2014, to 68% in 2019.

Figure no. 20. Activity rate at regional level (2014-2019), (MU %)

Source: Data processing - National Institute of Statistics 2020

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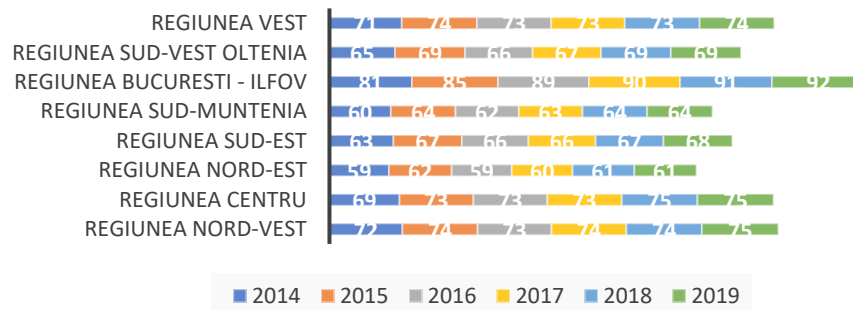
In the case of distribution by area of residence, according to the National Institute of Statistics (INS), the activity rate in 2019 for the population aged 15 and over in the South - East Region was 51.1% for the population from urban residence and 50.7% in the case of the population coming from rural areas. Thus, the region ranks last in terms of activity rate in urban areas, respectively in 6th place in terms of activity rate in rural areas, ahead of the West Region and the Centre Region. A first observation that can be drawn based on the comparative analysis of this indicator aims at the lower level of economic activity among the population in the South-East region compared to the national average (by 5 percentage points) and compared to the rest of the development regions However, the literature[6] points out the importance of achieving higher rates of participation in economic life among adults (between 25 and 60 years) and less among people in the age category 15-19 years, in which case the training in the education system is more important - a situation more common in the case of countries with a profile of leaders in innovation, respectively with performance in innovation. Thus, for a clearer interpretation of the impact of this indicator, it is necessary to complete the comparative analysis with the broken-down situation of the activity rate at the level of age categories, respectively by sex.

Figure no. 21. Activity rate at regional level at urban level 2014 - 2019, (MU %)
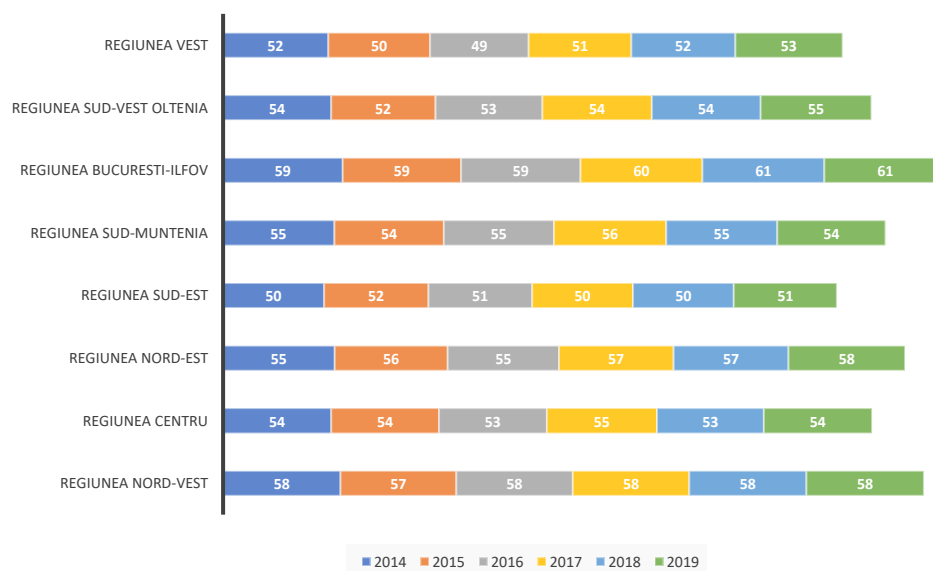
Source: Data processing - National Institute of Statistics 2020

At national level, the activity rate of the working age population (15-64 years) [7] registered in 2019 the share of 68.6. The gender distribution at the level of the indicator indicates a higher share in the case of men - respectively 70% compared to women - where the activity rate is 58.9%. At regional level, the highest values of the activity rate were registered in the North-East region (of 74.8%), respectively the Bucharest-Ilfov region (74.1%).

Figure no. 22. Regional activity rate at rural level 2014 - 2019, (MU %)
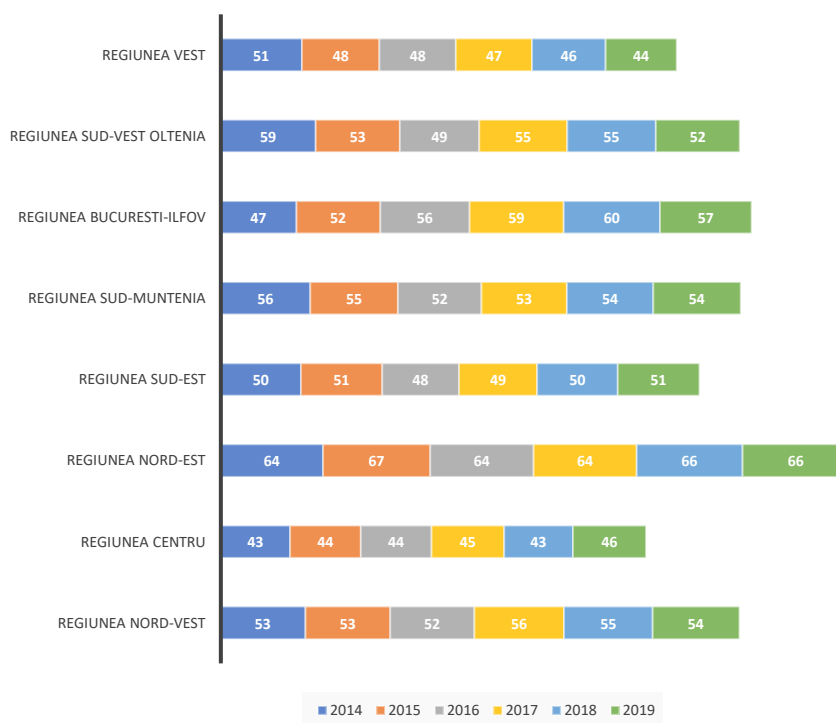
Region	2014	2015	2016	2017	2018	2019
REGIUNEA VEST	51	48	48	47	46	44
REGIUNEA SUD-VEST OLTENIA	59	53	49	55	55	52
REGIUNEA BUCURESTI-ILFOV	47	52	56	59	60	57
REGIUNEA SUD-MUNTENIA	56	55	52	53	54	54
REGIUNEA SUD-EST	50	51	48	49	50	51
REGIUNEA NORD-EST	64	67	64	64	66	66
REGIUNEA CENTRU	43	44	44	45	43	46
REGIUNEA NORD-VEST	53	53	52	56	55	54

Source: Data processing - National Institute of Statistics 2020

At the level of the South-East region, the value reached in 2019 at the level of this indicator was 64.7%, by 3.9 percentage points below the national average, but by 3.4 percentage points more than the value registered in 2016. Similar to the situation registered at national level, the activity rate of males in the South-East region is higher (respectively of 70.2% in 2018) than that of females (respectively of 63.2%), over the entire analysed time horizon (the average difference being 5.62% in the analysed period).

In the urban area, the highest share of the activity rate is registered in the regions North-East (71.1%) and Bucharest-Ilfov with 74.8%, while in the rural area in the North-East Region (77.5%). In the South-

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[7] The activity rate of the working age population (15-64 years) is generally calculated by sex, by areas and by age groups.

East Region, the activity rate is higher in urban areas than in rural areas among the population aged 15-64. In the period 2016-2019, the activity rate in the South-East Region experienced a constant increase among the population aged between 15 and 64 (at the level of 2019, the indicator registering an increase of 3.4 percentage points compared to of the value reached in 2016), the most important increases being registered among people aged between 15 and 24 years (of 4.2% in 2019 compared to 2016), respectively 35 and 54 years (of 3.8% in 2019 compared to 2016). However, in the case of the population aged between 25 and 34, the activity rate decreased slightly between 2016 and 2018, stabilizing at 76.7% in 2019.

Next, the dynamics of the **civilian employed population** will be presented, indicator that includes, according to the NIS, people who have an income-generating occupation, which they usually exercise in one of the activities of the national economy, in order to obtain incomes in the form of wages, payment in kind etc. It should be noted that the employed civilian population does not include military personnel, detainees and employees of political and collective organizations.

Tabel no. 1. Employed population at national, regional and county level 2014 - 2019 (MU thousand people)

	2014	2015	2016	2017	2018	2019
Romania	**8432**	**8341**	**8318**	**8367**	**8408**	**8493**
South – East Region	986	969	945	949	949	956
Constanța	291	289	286	284	284	287
Brăila	119	117	115	119	118	117
Galați	183	180	175	177	178	179
Buzău	171	166	157	158	159	160
Vrancea	137	134	130	130	130	131
Tulcea	82	80	79	80	79	80

Source: Data processing - National Institute of Statistics 2020

According to the data in the table presented above, the index of the employed population in the South-East Region shows a decreasing trend as a whole, from 986 thousand people in 2014 to 956 thousand people in 2019 (representing a decrease of 3 percentage points), a change that can also be explained based on the aging phenomenon of the population (people aged between 65 and 69 years representing in 2019 over 9% of the population of the region aged between 15 and 69 years). Following the situation at county level, the most significant decreases observed at the level of this indicator were registered in the case of Buzău county, respectively of Vrancea county, at the level of 2019 the total employed population decreasing compared to 2014 by 6.3%, respectively by 4.3%.

Regarding the distribution of the employed population by sectors of activity, it can be seen that 25% of the civilian employed population in the region is employed in agriculture, 17% in manufacturing and 15% in wholesale and retail trade, repair motor vehicles and motorcycles. These three sectors are the most representative in the region, the least representative being the extractive industry (at which the share of the employed population in the region was 0.43% in 2019) and real estate transactions (in which the share of the employed in the region was 0.36%).

Figure no. 23. Employed population in the South-East Region broken down by economic sectors CANE 2, 2014 - 2019 (MU thousand)people)

Legend:
- Agriculture, forestry and fishing
- Manufacturing industry
- Wholesale trade, repair of vehicles and motorcycles
- Construction
- Transport

Source: Data processing - National Institute of Statistics 2020

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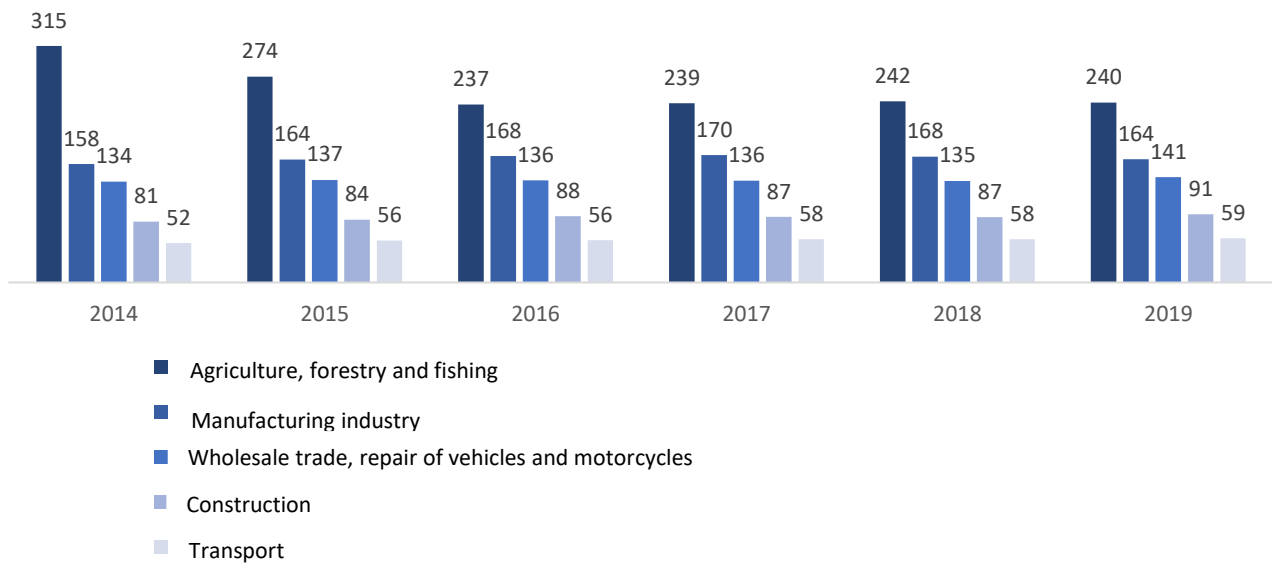
Instrumente Structurale
2014-2020

Figure no. 24. Employed population in the South-East Region, broken down by sectors of activity
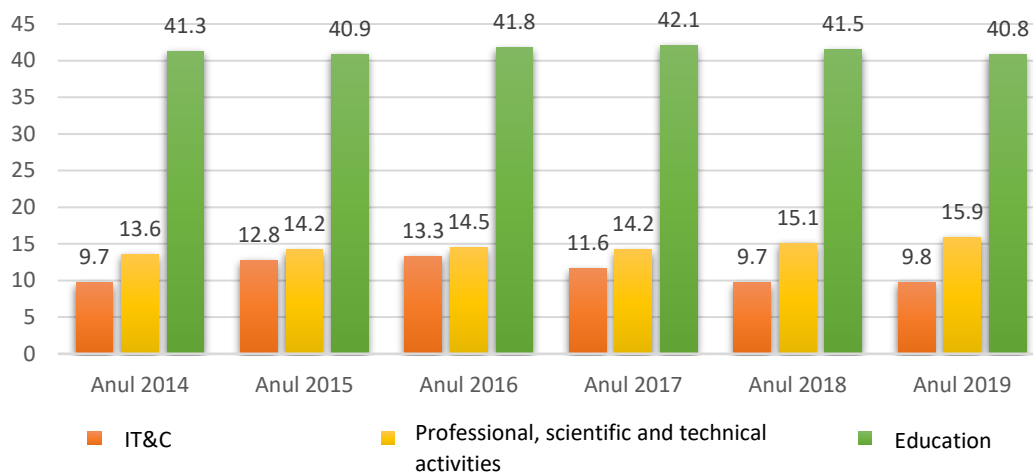
Source: Data processing - National Institute of Statistics 2020

Regarding the Information and Communications sector, in the reference period 2014 - 2019 a greater variation was observed in the period 2014 - 2017, when, after an increase in 2015 of the total employed population in the region at the level of this sector (by over 30 % compared to the previous year), the values related to this indicator were constantly decreasing until the level of 2019 when a slight increase could be observed. At the level of professional, scientific and technical activities, however, at the level of the South-East region, in the reference period 2014 - 2019 a constant growth trend could be observed - even if numerically lower (respectively from 136,000 people employed in 2014 to 159,000 employed persons in 2019).

As a result of the analysis of the employed population, **the employment rate of labour resources can be calculated by age groups, areas of residence and sex** [8], both at regional level and at the level of counties in the region.

At national level, the employment rate in 2015 was 65.8%, increasing compared to 2018 by 1 percentage point. Similar to the situation in previous years, the employment rate was higher among the male population (74.6%, compared to 56.8% for women). Regarding the areas of residence, the employment rate was higher in urban areas (67.1%, compared to 64.2% in rural areas).

At regional level, the South-East Region ranks 6th in 2019 in terms of human resources employment rate (64%), registering higher values only compared to the Centre Region 63.9%.

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[8] The employment rate is the share of the employed population in age group x in the total population in the same age group x. The employed population includes all persons aged 15 and over who have carried out an economic or social activity producing goods or services for at least one hour during the reference period in order to obtain income in the form of wages, payment in kind or other benefits.

Figure no. 25. Employment resources by development regions (2014 - 2019), (MU %)

Region	2014	2015	2016	2017	2018	2019
Center Region	59	61	63	66	64	65
South-East Region	59	62	61	62	64	65
West Region	64	62	61	64	65	65
South-West Region	67	61	60	66	67	69
South-Muntenia Region	65	64	65	68	69	70
North-West Region	69	68	69	72	73	72
Bucharest-Ilfov Region	68	70	71	74	75	76
North-East Region	73	76	75	76	78	80
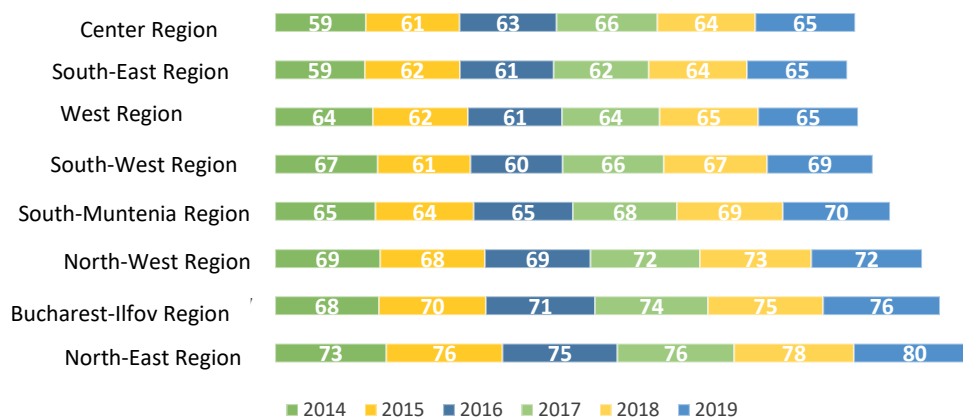
Source: Data processing - National Institute of Statistics 2020

At the level of age groups, in 2018, the employment rate of the working age population (15-64 years) reached the highest values in the Bucharest-Ilfov Region (71.3%) and in the North-East Region (71 , 8%), and the lowest in the South-East (59.1%) and Centre (59.0%) Regions[9].

Figure no. 26. Employment rate at the level of the South-East Development Region, by age groups (2014 - 2019), (MU %)

Age group	2014	2015	2016	2017	2018	2019
55 - 64	36.9	39	38.8	38.2	41.8	43.8
35 - 54	71.2	73.8	73.7	75.4	76.2	77.5
25 - 34	64.9	70.8	69.4	68.8	70.2	71
15-24	21.3	22.2	19.2	22.8	23.8	24
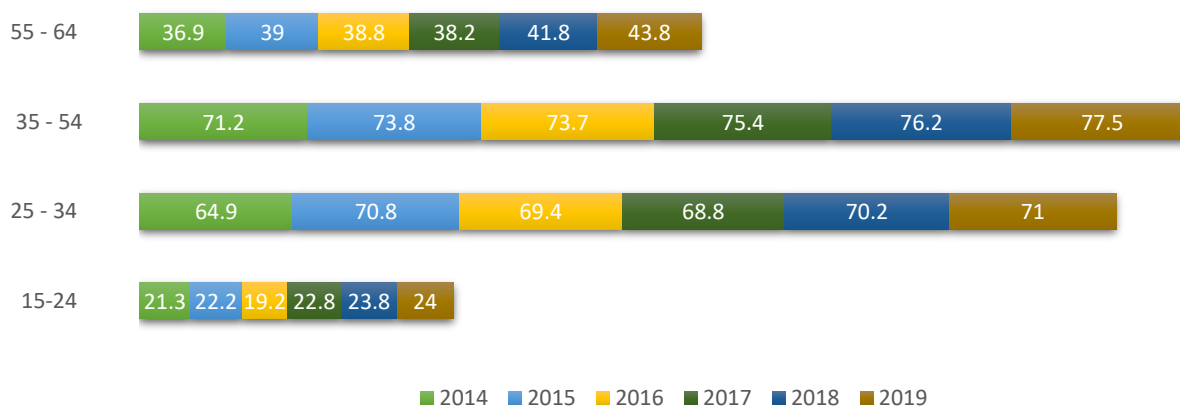
Source: Data processing - National Institute of Statistics 2020

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[9] https://insse.ro/cms/sites/default/files/field/publicatii/forta_de_munca_in_romania_ocupare_si_somaj_2018.pdf.

An analysis of the employment rate of labour resources at the level of the South-East Development Region, by age groups, reveals that the population aged between 35 and 54 years has the highest employment rate (76.2% in 2018), closely followed by the population aged 25-34, which has an occupancy rate of 70.2% in 2018, the two categories representing virtually the most active segment of the employed population, both regionally, as well as at national and European level. In terms of areas of residence, the employment rate in urban and rural areas shows similar values in the South-East Development Region, registering in 2017 a percentage of 58.5% of the population employed in urban areas and 56.4% employment rate in rural areas.

Figure no. 27. Employment rate of labour resources at regional level, in urban areas (2014 - 2019), (MU %)
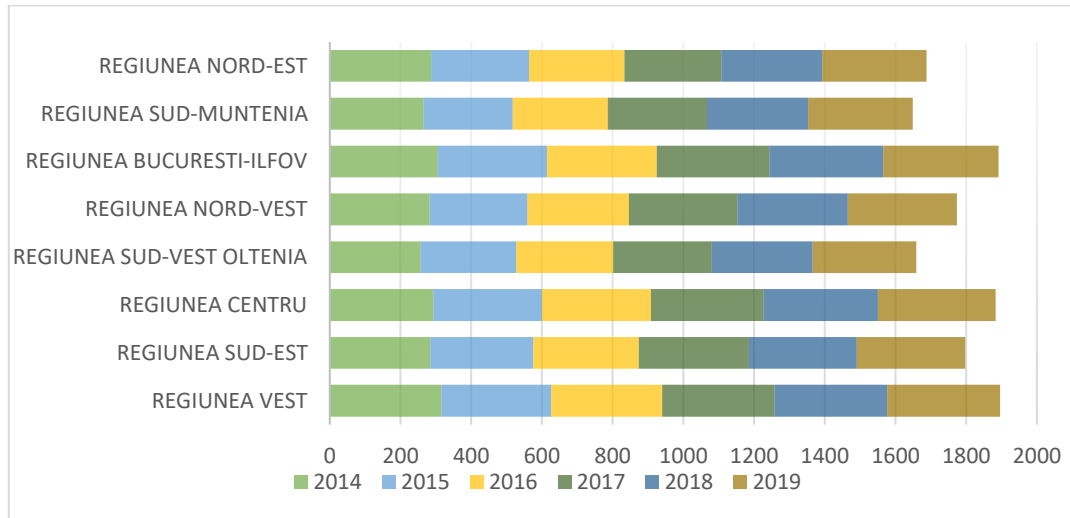
Source: Data processing - National Institute of Statistics 2020

Figure no. 28. Employment rate at regional level, in rural areas (2014 - 2019) (MU %)
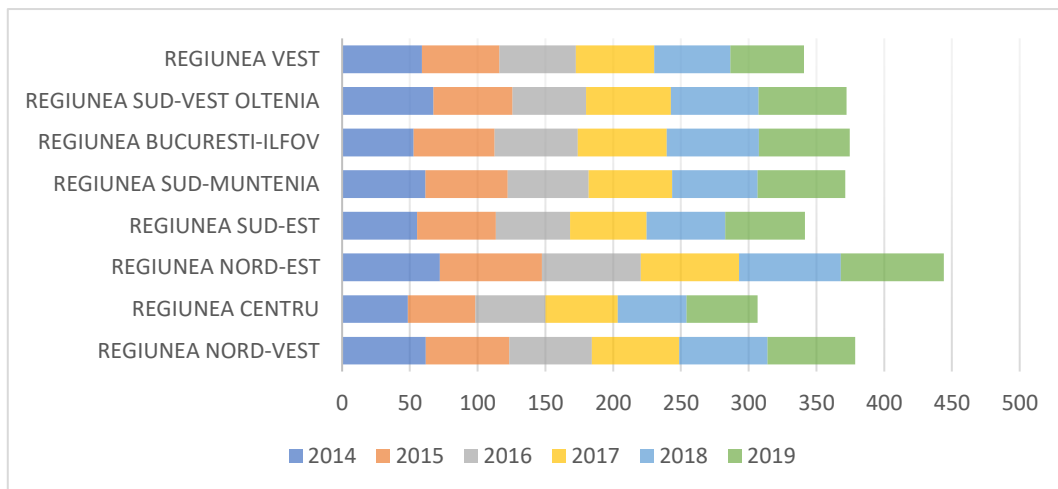
From the perspective of the employment rate by sex, it is generally observed that, with the exception of the North-East Development Region, all other regions have higher employment rate values among the male population. At the level of 2018, the employment rate among men in the South-East Region was 66.9%, while the employment rate among women was 60.3%. The existence of a higher degree of employment among men than women was also noted in the counties in the South-East Region.

Figure no. 29. Employment rate at the level of the South-East Development Region, by sex (2014 - 2018), (MU %)
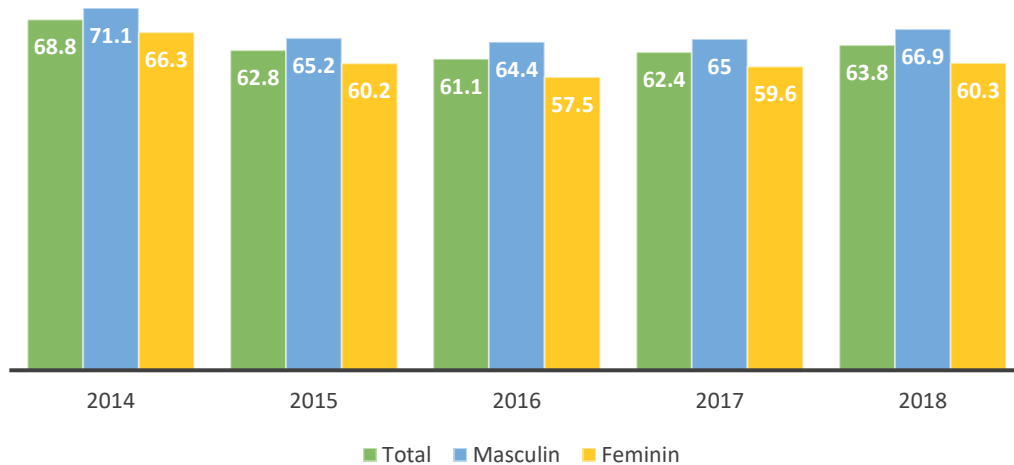
Source: Data processing - National Institute of Statistics 2020

Advancing to a micro level of labour force analysis, the evolution of the employment rate registered an upward trend in the period 2014 - 2019 in the counties of the region, the highest rate being registered in Vrancea county (68.1%), and the lowest rate in Galati county (56.1%).

Figure no. 30. Employment rate of the South-East Region distributed by counties (2014-2018) (MU %)

2014: Brăila 63, Buzău 66, Constanța 65, Galați 55, Tulcea 64, Vrancea 69

2015: Brăila 63, Buzău 64, Constanța 65, Galați 55, Tulcea 64, Vrancea 68

2016: Brăila 62, Buzău 61, Constanța 64, Galați 53, Tulcea 62, Vrancea 66

2017: Brăila 66, Buzău 62, Constanța 65, Galați 55, Tulcea 65, Vrancea 67

2018: Brăila 67, Buzău 64, Constanța 66, Galați 56, Tulcea 65, Vrancea 68

Legend: Brăila, Buzău, Constanța, Galați, Tulcea, Vrancea
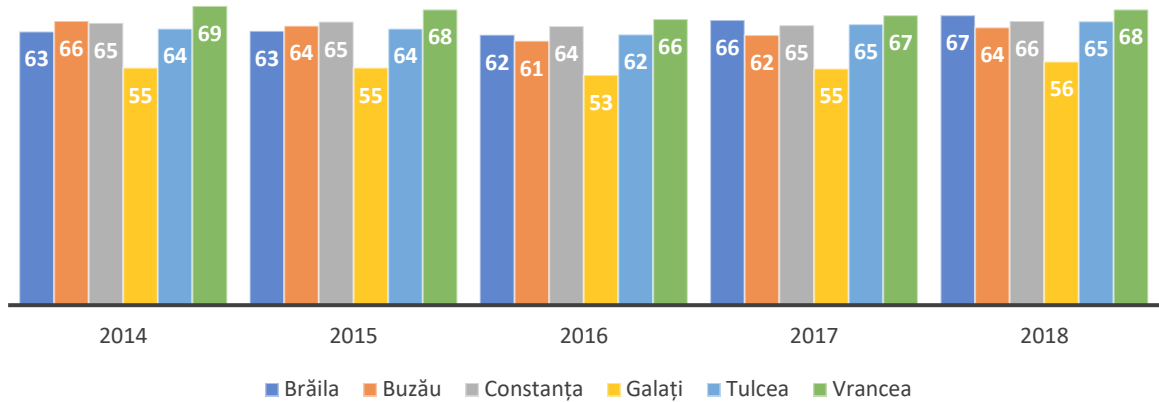
Source: Data processing - National Institute of Statistics 2020

Regarding the employment rate of labour resources by sex it can be seen from the graphs below that in 2018 the female population employed in the counties of the region was the highest in Vrancea County (66.3%), while the lowest employment rate of the female population was registered at the level of Galati County (54.1%). At the level of the male population, the employment rate registered at the level of 2018 a percentage of over 60% at the level of each county of the region (Figure no. 32). Moreover, for both the male and female population, an increase in the employment rate compared to 2014 can be observed in 2018 (a growth rate of 9% in 2018, compared to 2014).

Figure no. 31. Employment rate at county level, male population (2014 - 2018) (MU %)

2014: Vrancea 65, Tulcea 61, Galați 55, Constanța 69, Buzău 64, Brăila 63

2015: Vrancea 67, Tulcea 61, Galați 56, Constanța 73, Buzău 65, Brăila 64

2016: Vrancea 65, Tulcea 61, Galați 55, Constanța 73, Buzău 62, Brăila 64

2017: Vrancea 67, Tulcea 63, Galați 57, Constanța 72, Buzău 63, Brăila 67

2018: Vrancea 70, Tulcea 65, Galați 58, Constanța 74, Buzău 64, Brăila 69

Legend: Brăila, Buzău, Constanța, Galați, Tulcea, Vrancea
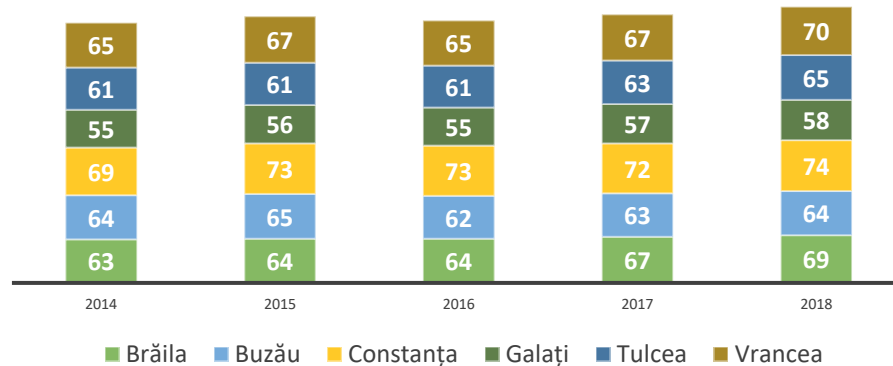
Source: Data processing - National Institute of Statistics 2020

Figure no. 32. Employment rate at county level, male population (2014 - 2018) (MU %)

	2014	2015	2016	2017	2018
Vrancea	73	69	67	67	66
Tulcea	66	66	64	66	65
Galați	54	53	51	52	54
Constanța	60	57	55	57	57
Buzău	67	64	59	62	64
Brăila	63	62	60	64	64

■ Brăila ■ Buzău ■ Constanța ■ Galați ■ Tulcea ■ Vrancea
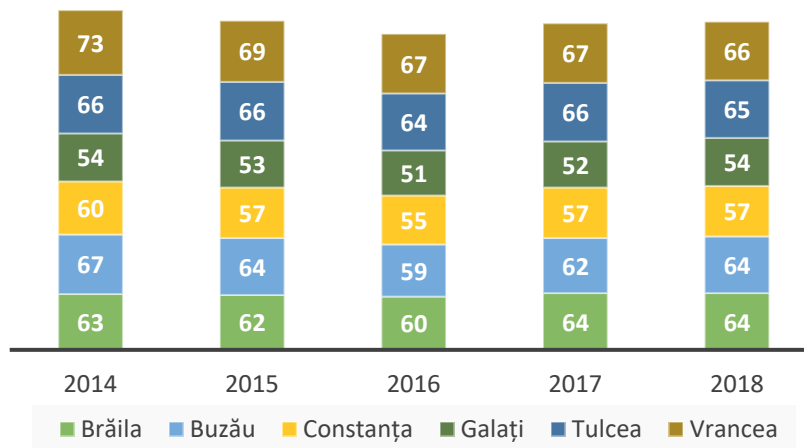
Source: Data processing - National Institute of Statistics 2020

The employment rate of the population was also interpreted by comparing Romania's employment rate **to other EU member states**. Thus, in 2019 (70.9%), the employment rate of Romania represents 94.15% of the average value of the employment rate registered at the level of the 27 member states of the European Union. Making a comparison with the other member states of the European Union, Romania ranks, in terms of employment rate, in similar positions to Belgium, Spain, Croatia and France.

Figure no. 33. Employment rate, at the level of the Member States of the European Union, 2019 (MU %)
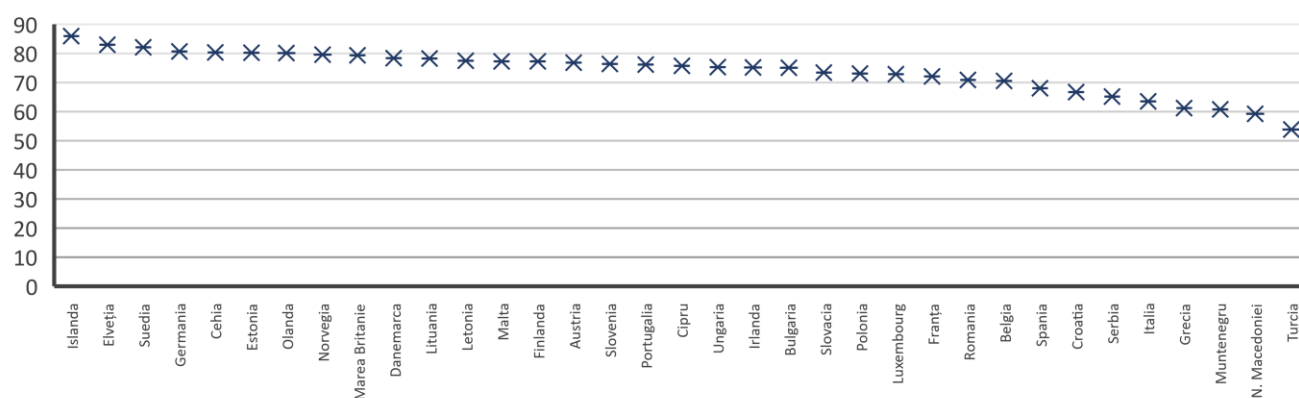
Source: Data processing - EUROSTAT 2020

Figure no. 34. Employment rate (MU %) of labour resources in the Member States of the European Union, 2019
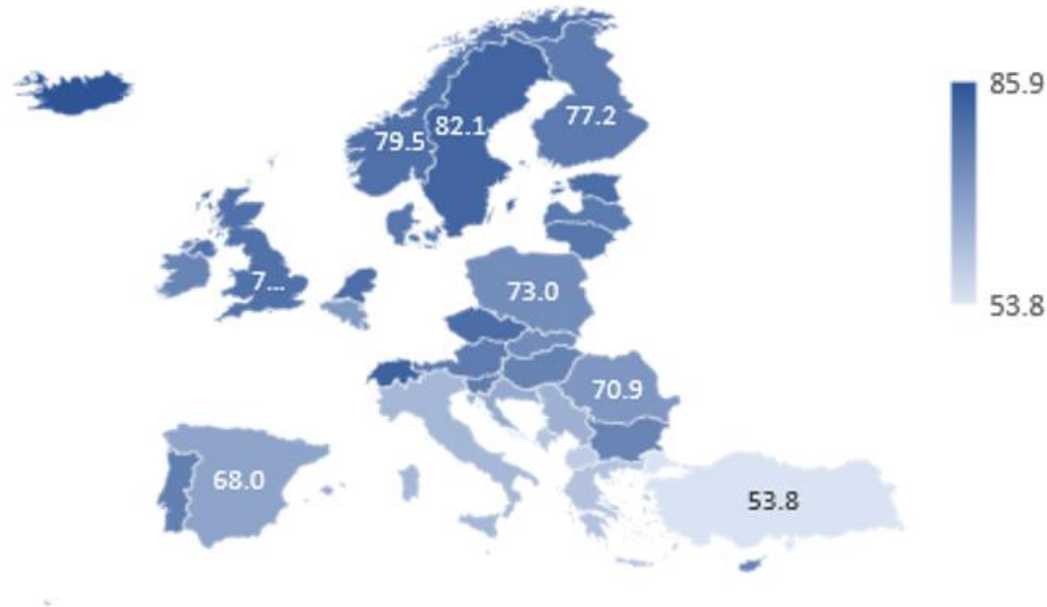
Source: Data processing - EUROSTAT 2020

Another factor that influences the rate of economic development of either a region or a state is the unemployment rate[10] recorded in a certain period at the level of that region or that state.

Therefore, the evolution of the **unemployment rate by age groups, areas of residence and sex** will be further presented.

At national level, according to the National Institute of Statistics, in 2018, the unemployment rate was 3.3%, being lower than in 2017 when it registered the value of 4%. The breakdown by regions of the country highlights the fact that the highest unemployment rate was recorded in 2019 in the South-East region (6%), but also in the South-West Oltenia (5%) and North-East (2%) Regions.

An in-depth analysis of the unemployment rate in the South-East Region highlights the fact that the region recorded an unemployment rate of 6% three consecutive years (2017, 2018, 2019), only in 2015 and 2016 the region recorded a lower rate than the South–Muntenia Region.

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[10] The unemployment rate represents the share of the unemployed in the active population.

In contrast, the lowest unemployment rates were recorded in the Bucharest-Ilfov (2%) and West (3%) Regions. Moreover, from Figure no. 35 it can be seen that the South-East Region experienced the lowest values of the unemployment rate in 2017 (5.6%) and 2018 (4.6%).

Figure no. 35. Unemployment rate at regional level (2014 - 2019), (MU %)
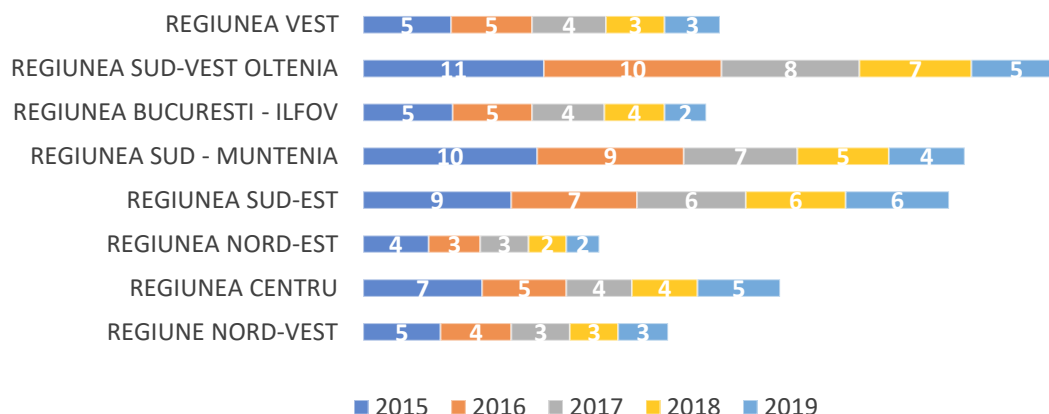
Source: Data processing - National Institute of Statistics 2020

In terms of areas of residence, at the national level the unemployment rate in rural areas (4.5% in 2019) was higher than in urban areas (3.4% in the same year). A similar situation is observed in the South-East Development Region, but the weights recorded in 2019 indicate a much more significant contrast in the areas of residence, the unemployment rate among the urban population being 4.9%, and in the rural area being of 8.1% (by 3.6 percentage points more than the national average among the population residing in the rural area).

Figure no. 36. Unemployment rate at regional level, in urban areas (2014 - 2019), (MU %)
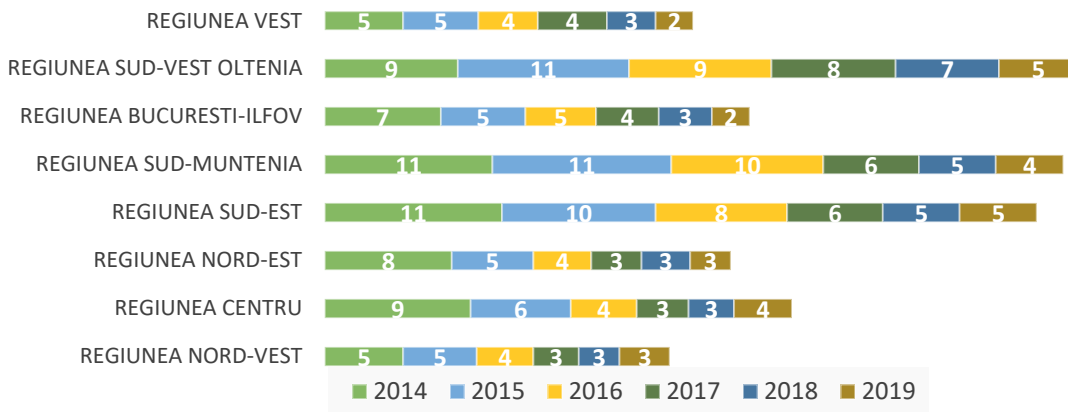
Source: Data processing - National Institute of Statistics 2020

Figure no. 37. Unemployment rate at regional level, in rural areas (2014 - 2019), (MU %)
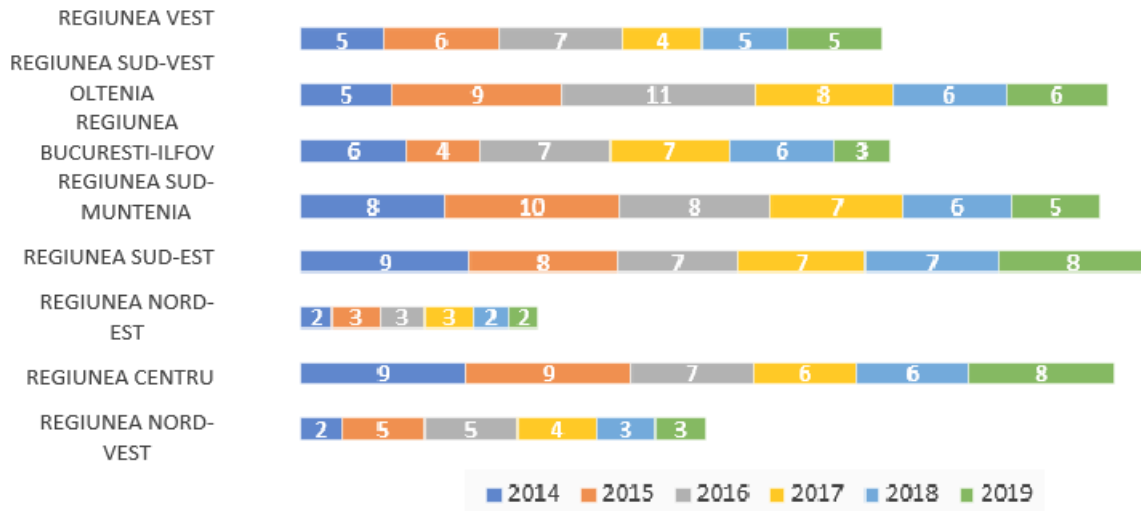
Source: Data processing - National Institute of Statistics 2020

Regarding the unemployment rate in the counties of the South-East Region, the in-depth analysis of the collected data showed that Constanța County recorded in 2018 the lowest unemployment rate compared to other counties in the region (2.7%). On the other hand, the counties with the highest unemployment rate in the region are Buzau (7.3%) and Galati (6.3%).

The low unemployment rate in Constanța County confirms that the county is one of the most economically developed counties in the region. This contributes to increased attractiveness for investors, as well as an environment conducive to setting up new businesses. The economic context of

Constanța County is due to the fact that it has a developed university center and to the fact that it is a port and tourist area.

Figure no. 38. Unemployment rate in the South-East Region distributed by counties (2014 - 2019), (MU %)
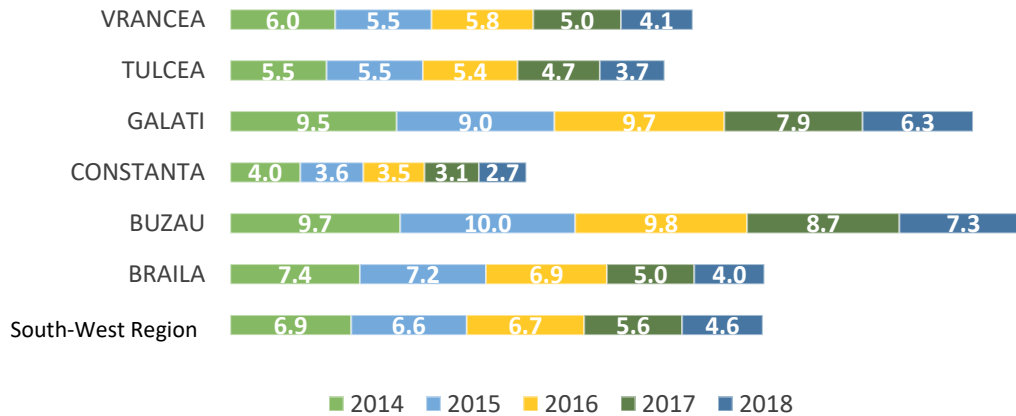
Source: Data processing - National Institute of Statistics 2020

According to the graph below (Figure no. 39), the highest unemployment rate in the South-East Region was registered among the population aged 15-24 (23% in 2019), and the lowest value was registered among the population aged 55-64 (2.8% in 2019).

Figure no. 39. Unemployment rate in the South-East Region by age categories (2014 - 2019), (MU %)
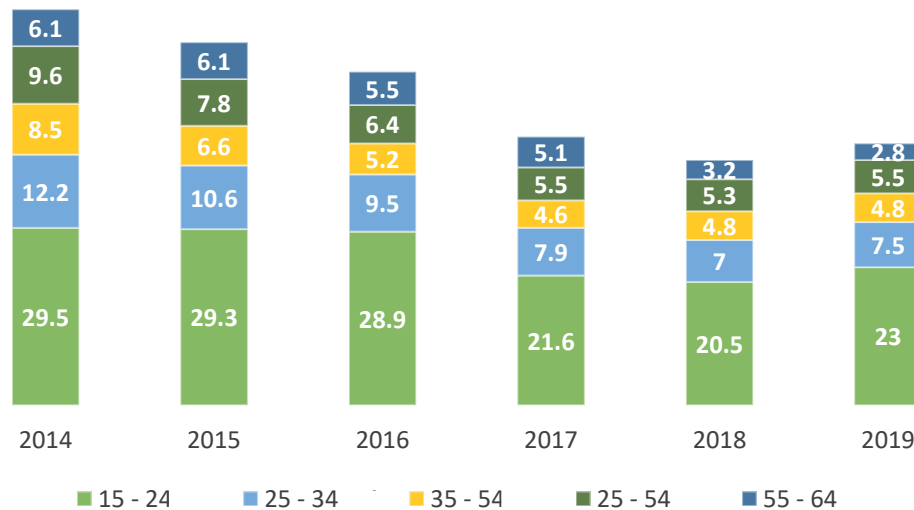
Source: Data processing - National Institute of Statistics 2020

Other relevant factors in the diagnosis of the labour situation in the South-East Region also concern the analysis of the number of existing graduates in the analysed region, as well as the level **of training of the population**[11].

Before providing an analysis of the level of education of the population in the South-East Region, a brief presentation of the educational infrastructure that the region offers to the inhabitants will be made. The educational infrastructure consists mainly of existing educational units. Those of interest for this strategy are the school units that support high school, vocational, post-high school and foremen, as well as university education.

At national level, there are a number of 1,804 school units from the categories mentioned above, but in the period 2014 - 2019 a decrease in the number of active school units can be observed.

Figure no. 40. Number of schools active at national level

| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
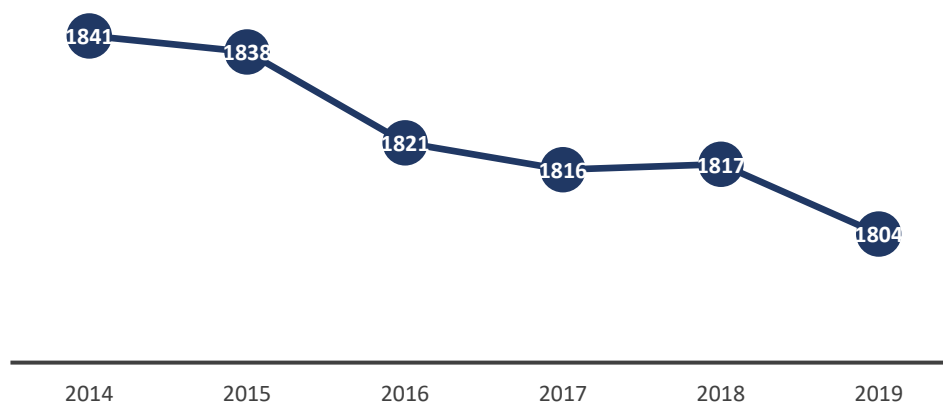
Source: Data processing - National Institute of Statistics 2020

Currently, at the level of the Region there are 229 units of this type, most of them belonging to the category of high school education (206 school units). The total evolution of these units is shown in the graph below. Compared to the number of active schools at national level, in the South-East Region there is a percentage of 13% of the total at national level.

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[11] The graduate is the pupil / student who passed the last year of study of a school / faculty, regardless of whether or not he / she passed the graduation exam, baccalaureate, bachelor's degree, etc. The number of graduates refers to the end of the school / university year (after the correctness exam). A graduate with a diploma is the person who passed the graduation exam at the end of an educational cycle and obtained a diploma (eg baccalaureate diploma, bachelor's degree, master's degree, doctoral diploma, graduation diploma etc.).

Figure no. 41. Active school units in the South-East Region
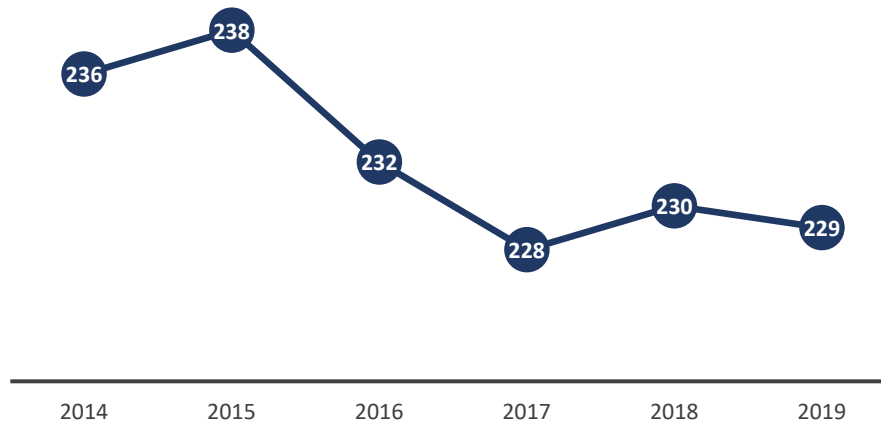
Source: Data processing - National Institute of Statistics 2020

At county level, most active schools are located in Constanța County, and the fewest in Tulcea County. Regarding the university education units, they are located in Constanța and Galați counties.

Figure no. 42. Active school units in the counties of the South-East Region
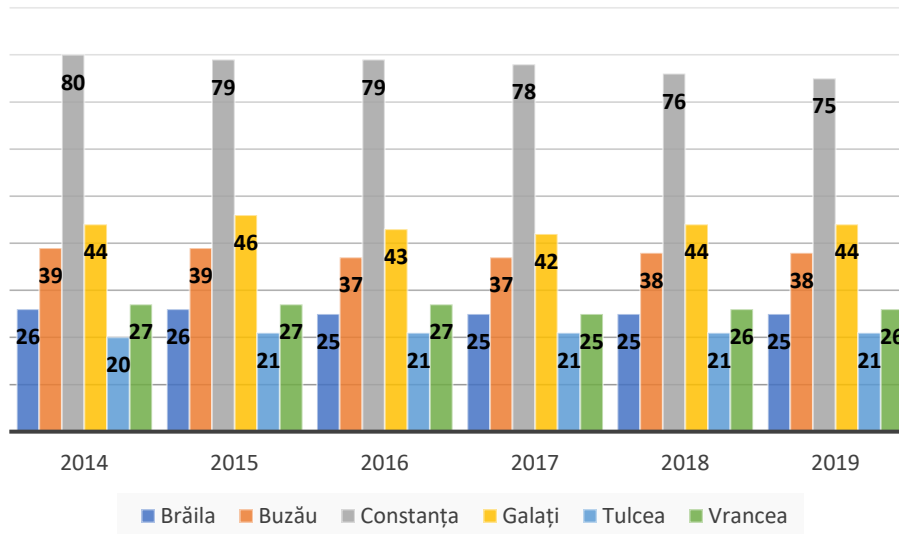
Source: Data processing - National Institute of Statistics 2020

According to the chart above, it can be seen that at the level of all counties in the Region, the number of active school units has decreased for all categories of education.

At national level, the university offer includes 10 groups of specializations such as: Education Sciences, Arts and Humanities, Social Sciences, Journalism and Information, Business, Administration and Law, Natural Sciences, Mathematics and Statistics, Information and Communication Technologies (ICT), Engineering, processing and construction, Agriculture, forestry, fish farming and veterinary sciences, Health and social work.

Between 2014 and 2019, the number of students and trainees enrolled in university education (bachelor's, master's, postgraduate courses, doctorate and postdoctoral programs of advanced research) increased by approximately 2,000 people.

Figure no. 43. The situation of students enrolled in university education at national level
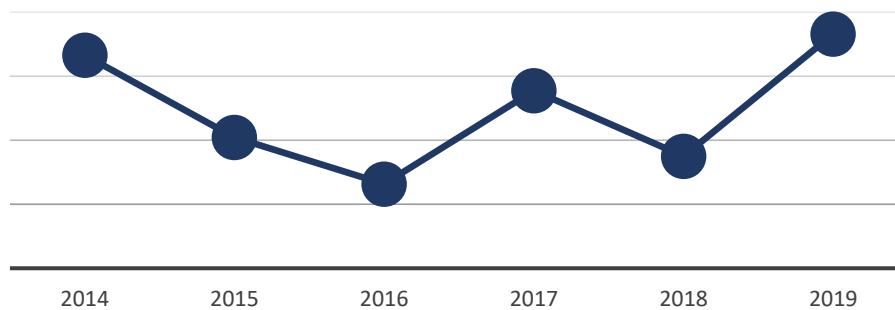
Source: Data processing by the research team

The evolution of the specialization groups during this period can be observed in the graph below.

Figure no. 44. The situation of students enrolled in university education at national level according to specializations

Legend:
- Stiintele educatiei
- Arte si stiinte umaniste
- Stiinte sociale, jurnalism si informatii
- Afaceri, administratie si drept
- Stiinte naturale, matematica si statistica
- Tehnologiile informatiei si comunicatiilor (TIC)
- Inginerie, prelucrare si constructii
- Agricultura, silvicultura, piscicultura si stiinte veterinare
- Sanatate si asistenta sociala
- Servicii
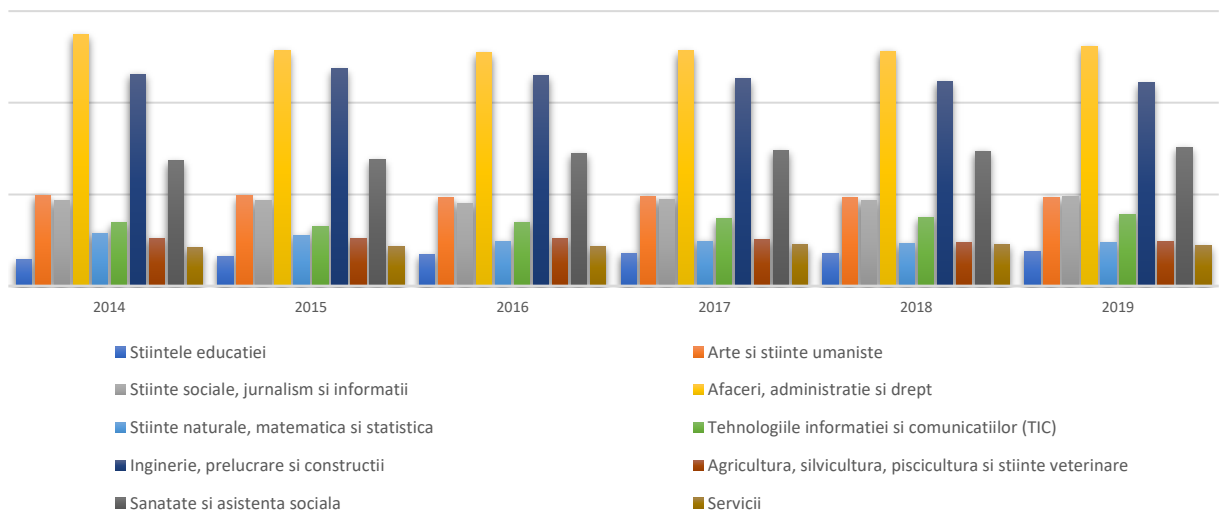
Source: Data processing by the research team

It can be observed that in all the years analyzed, the most students were at the level of business, administration and law specialization, representing in 2019, 24% of the total number of students enrolled in all specializations. The second specialization group to which most students are enrolled is engineering, processing and construction, where 20% of the total is enrolled. The third specialization group is health and social assistance, which registered in 2019 a percentage of 14%. The fewest students are enrolled in the specialization of education sciences (3% of the total).

Other areas of interest for this strategy are the groups Information and Communication Technologies (ICT) and Agriculture, forestry, fish farming and veterinary sciences which registered in 2019 a percentage of 7% and 4%, respectively.

At regional level, the educational offer of higher education institutions (bachelor's degree, master's degree, postgraduate courses, doctorate and advanced research postdoctoral programs) is considered to be applied and configured according to the particularities of the South East Region. The specializations and fields at the level of the region are concentrated in the counties of Constanța and Galați, which are also university centers. The analysis of the educational offer that the university centers mentioned above offer to the students allows to observe the fact that they are in accordance with the development fields for which the South-East Region is recognized.

Thus, regarding the educational offer of state and private institutions, at the level of the South-East Region it can be seen that there is a total number of 42 faculties and 216 undergraduate programs

covering a maximum number of 15,223 students. Among the most relevant specializations and bachelor's degree fields are engineering and management in agriculture and rural development, construction engineering, industrial, energy and maritime engineering, food engineering, automation, electrical and electronic engineering, business management, medicine and environmental sciences. It is important to mention that at the level of the region several university institutions offer specializations in the field of naval engineering, navigation, respectively naval management - field with significant economic impact in the region and with potential for intelligent developmentThus, the Naval Academy "Mircea cel Bătrân" offers specializations in marine engineering and navigation and naval management, the Maritime University of Constanța offers specialization programs in navigation and naval transport, respectively in naval electromechanics, "Ovidius" University of Constanța has included in the educational offer bachelor's, master's and postgraduate programs in marine engineering, and the "Dunărea de Jos" University of Galați also offers bachelor's, master's and doctoral programs in the field of naval architecture.

Also, at the level of the region there is a wide range of specialization in research areas such as:

- Food engineering (bachelor - doctorate);
- Biotechnologies (bachelor - doctorate);
- Animal husbandry (bachelor);
- Oil processing (bachelor - master's degree);
- Technological physics (bachelor - doctorate);
- Chemical engineering (bachelor - doctorate);
- Business administration and marketing (bachelor - doctorate).

Tabel no. 2. Educational offer at the level of the South-East Region

Higher education institution	No. of faculties	No of bachelor fields	No of bachelor programs	Maximum no of students who can be educated
Constanta Ovidius University	16	49	87	5996
Constanța Maritime University	2	6	13	1240
Dunărea de Jos University	14	55	81	4912
Naval Academy Mircea Cel Bătrân	2	4	9	595
Andrei Șaguna University	4	9	9	805
"Danubius" Galați University	3	2	2	275
"Gaudeamus" Foundation - "Tomis" University of Constanța	1	2	2	275

Source: Data processing by the research team - INSSE, 2020

Also, the educational offer for master's university education consists of specializations with a special relevance to the current context such as organic farming, agricultural systems and monitoring of areas vulnerable to drought, sustainable development in the coastal area and eco-tourism of the coastal area, optimization port technologies and equipment operation, navigation and maneuvering of the ship under special conditions etc.

By graduating courses in these specializations available in the South-East Region, graduates are trained as future specialists by refining managerial and specialized training and acquiring research-development-innovation skills. Moreover, students can achieve a high level of scientific, engineering and managerial knowledge but also acquire practical skills appropriate to current and future needs for the shipping and offshore transport industry, an extremely important field in the South-East Region.

Figure no. 45. The situation of graduates at the level of all educational cycles at regional level (2014 - 2018), (MU thousand people)
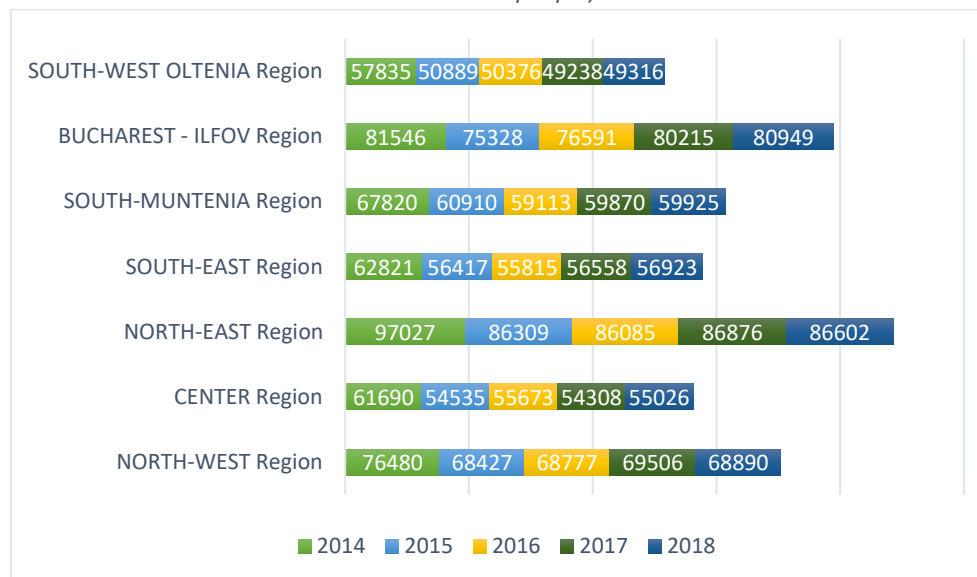
Source: Data processing - National Institute of Statistics 2020

At regional level, it is observed that the total weights of graduates are relatively constant throughout the analysed period. Regarding the South-East Region, in 2018 a number of 56,923 thousand graduates were registered, an increased number compared to 2017, but decreased compared to 2014 when 62,821 thousand graduates were registered.

Carrying out the analysis of the situation of graduates by levels of education in the period 2014 - 2018 allows a clearer understanding of vocational training in the region. Thus, the number of graduates of bachelor education in the counties of the region is as follows: Constanța County has the highest number

of graduates in the region (3,634 graduates of bachelor education), while the lowest number of graduates was registered in Vrancea County (68 graduates of bachelor university education). However, in the period 2014-2018, a decrease in the number of graduates by 6.6% can be observed in Constanța County. At the level of Galati County, however, there is an increase of 8.4% in the number of graduates.

Figure no. 46. University cycle - bachelor - graduates with a diploma at county level in the period 2014 - 2018 (MU number)
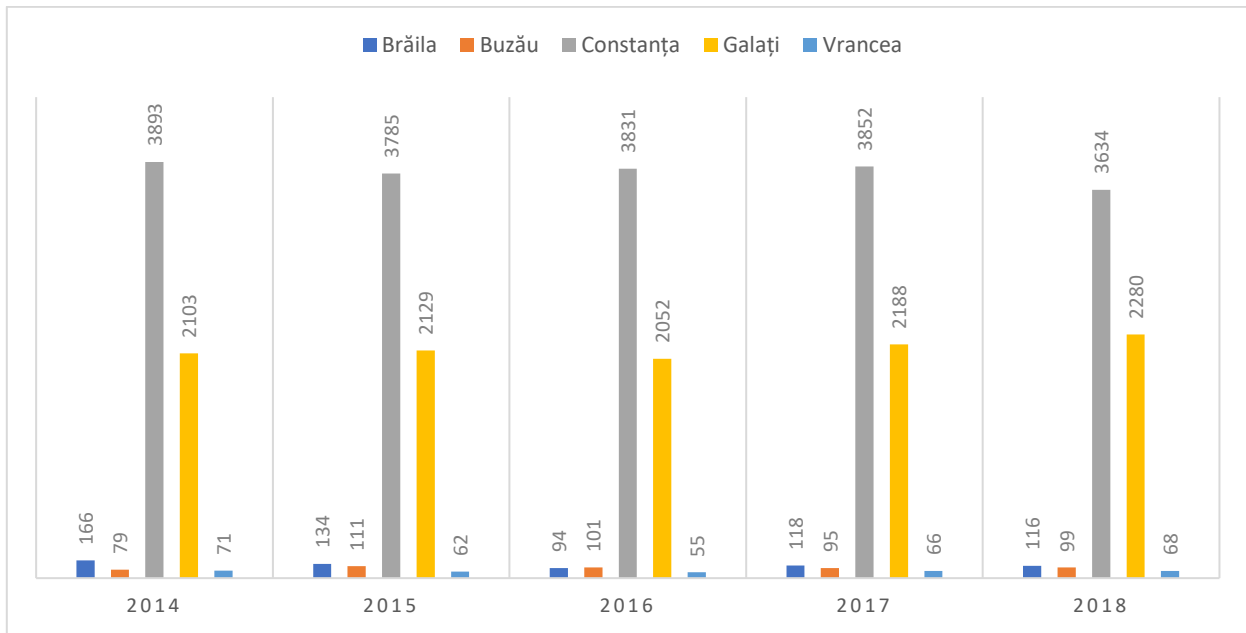
Source: Data processing - National Institute of Statistics 2020

Regarding the technical and vocational education, at the level of the analysed period there was a sustained tendency to increase the number of graduates of the vocational high school cycle, in the case of all counties being observed increases of over 100% in 2018 compared to 2014. the highest values were thus observed in the counties of Galați (with 610 graduates in 2019), Constanța (608 graduates) and Buzău (501 graduates). As an evolution, the number of graduates of vocational schools throughout the region increased by 147.6% in 2018 compared to 2014.

Figure no. 47. Vocational high schools - graduates at county level between 2014 and 2018 (MU: number)
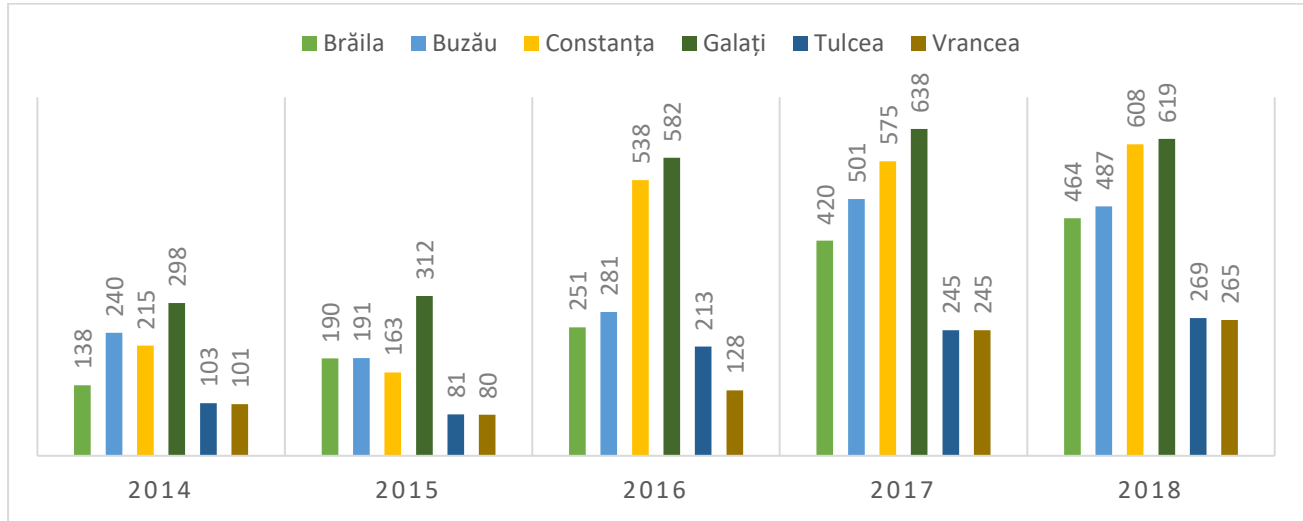
Source: Data processing - National Institute of Statistics 2020

Regarding the high school cycle, there is a decrease in the number of graduates in all counties, so that the regional decrease rate is of 21% between 2014 and 2018. However, the counties of Constanța, Buzău and Galați continued to register most graduates in the analysed period.

Figure no. 48. High school - graduates at county level between 2014 - 2018 (MU number)
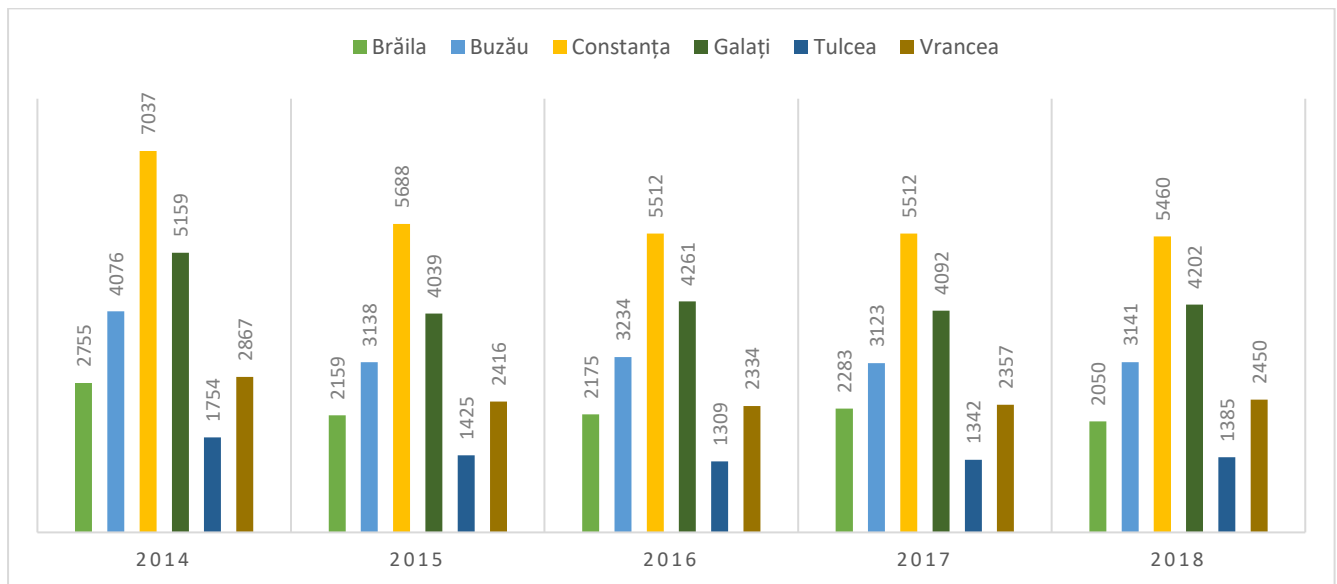
Source: Data processing - National Institute of Statistics 2020

Figure no. 49. Evolution of the number of high school graduates in the South-East Region in the period 2014 - 2018 (MU number)
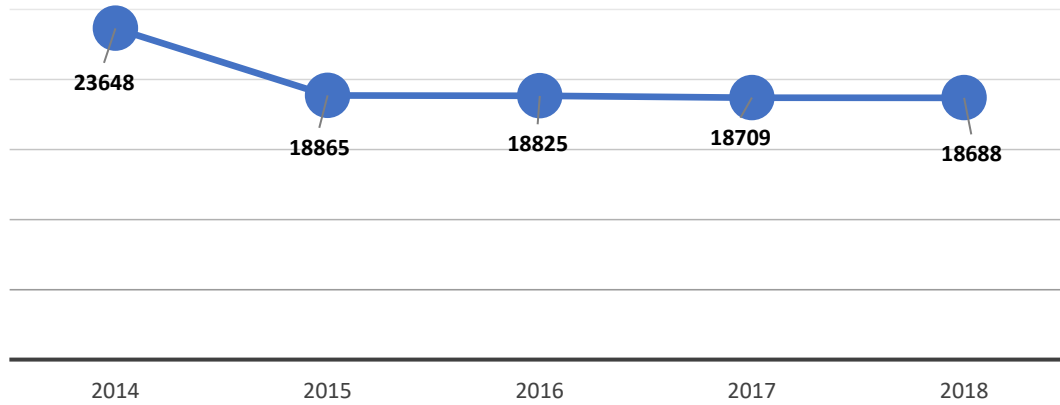
Source: Data processing - National Institute of Statistics 2020

At county level, the highest number of graduates at pre-university level was registered in 2018 in Constanța (13,674), followed by Galați (10,548), on the last place being Tulcea (3,792), also considering the lower number of inhabitants in the latter case. Moreover, at the level of all counties there is a decrease in the number of graduates of the pre-university cycle between 2014 and 2018.

Figure no. 50. The evolution of the number of graduates at pre-university level in the South-East Region, during 2014 - 2018
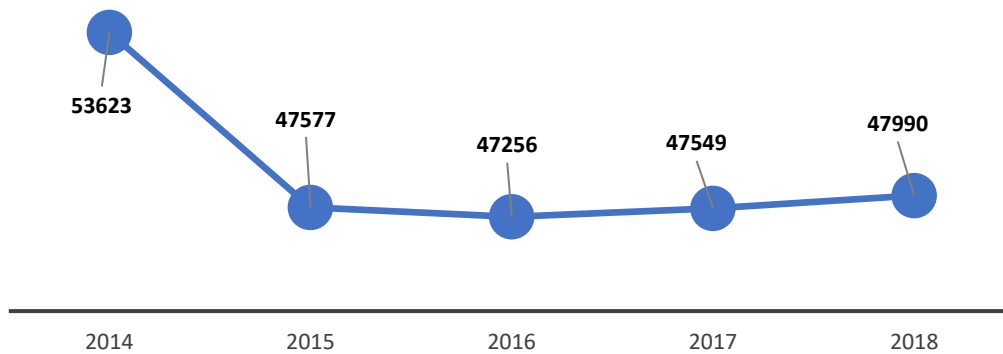
Source: Data processing - National Institute of Statistics 2020

A situation for the higher level of training is presented in the table below.

Tabel no. 3. Tertiary education graduates in the counties of the South - East Region (2018)

Form of education	Region/County	Year	Number
University education - graduates with a diploma - master's degree and postgraduate education	South-East Region	2018	2688
	Brăila	2018	82
	Buzău	2018	31
	Constanța	2018	1331
	Galați	2018	1192
	Vrancea	2018	32
	Tulcea	2018	0
University education - graduates with a diploma - doctorate and postdoctoral programs	South-East Region	2018	68
	Brăila	2018	0
	Buzău	2018	0
	Constanța	2018	52
	Galați	2018	16
	Vrancea	2018	0
	Tulcea	2018	0

Source: Data processing - National Institute of Statistics 2020

Entrepreneurship in the South-East Region - The situation of enterprises in the period 2014-2020

This section presents the situation of enterprises in the South-East Region, by highlighting the economic trends and the results of their activity reflected in the degree of development and level of competitiveness of the region. The main indicators analyzed in this section include the number of active local units and their distribution by size classes and branches, their density, the number of newly created enterprises in 2014-2018 and the rate of creation of active local units, the number of innovative enterprises and their share by activity sectors etc.

The number of active local units, including by economic branches and size classes

The National Institute of Statistics defines the enterprise as a group of legal units that is constituted as an organizational entity for the production of goods, commercial services or services of social interest, which benefits from an autonomy of decision, especially to ensure its current resources. On the other

hand, the active local unit represents an enterprise or part of it (workshop, factory, warehouse, office, mine, station etc.) located at an identifiable address and which is economically active (during the period observation), respectively realizes goods or services, records expenses and draws up the balance sheet.

In order to present the structure of active local units in Romania, their number in absolute value for 2018 was selected, both by development regions and counties, so as to outline two interconnected images: an image that captures the spread of active local units at regional level, and an image at county level, which offers an increased granularity and a perspective on local leaders.

The analysis performed at regional level reveals a relatively uniformly distributed regional structure. However, the Bucharest-Ilfov Region is the most developed region in terms of active local units, in 2018 presenting almost a quarter of the total number of active local units registered nationally. At the opposite pole is the South-West Oltenia Region, with a share of only 7%, noticeably lower than the rest of the regions and decreasing by 2% compared to 2015. The position of the South-East Region in relation to the other development regions of Romania it remained relatively unchanged. If in 2015, it registered 11% of the total local units active at national level, the same share can be observed even in 2018.

Figure no. 51. Structure of local units active at regional level, in 2018 (%)
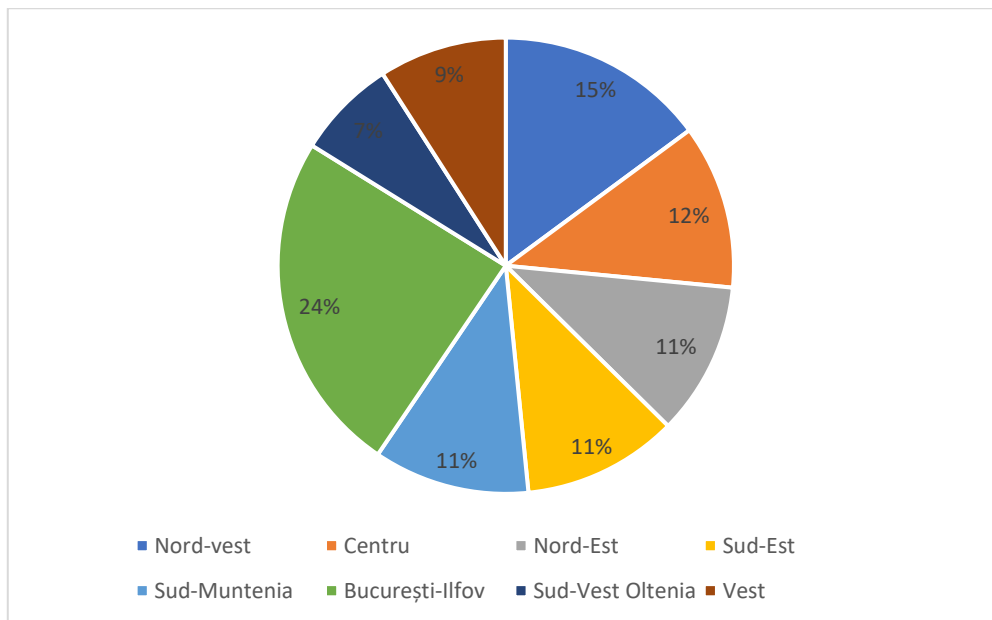
Source: Data processing - National Institute of Statistics 2020

The analysis of the number of active local units, at county level, allows highlighting the reasons underlying the previously observed hierarchy, at regional level. Thus, the main anomaly identified is

represented by the Bucharest Region, which registers a share 3.3 times higher compared to Cluj-Napoca County (ranked on position 2) and which brings together 118,110 active local units. Similarly, the share of the North-West region can be interpreted (on the 2nd place at national level) considering that 2 of the first 10 counties as number of active local units are found in the North-West Development Region.

The hierarchy of counties and development regions, from the perspective of the number of active local units, confirms that the general level of development of a city is a determining factor of entrepreneurial initiatives carried out on its territory. As expected, there is a concentration of a significant number of local units in Bucharest, although recent regional initiatives bring with them the prospect of diversifying professional opportunities also in the other regions of the country.

Figure no. 52. Distribution of the number of local active units at county level (excluding Bucharest), 2018
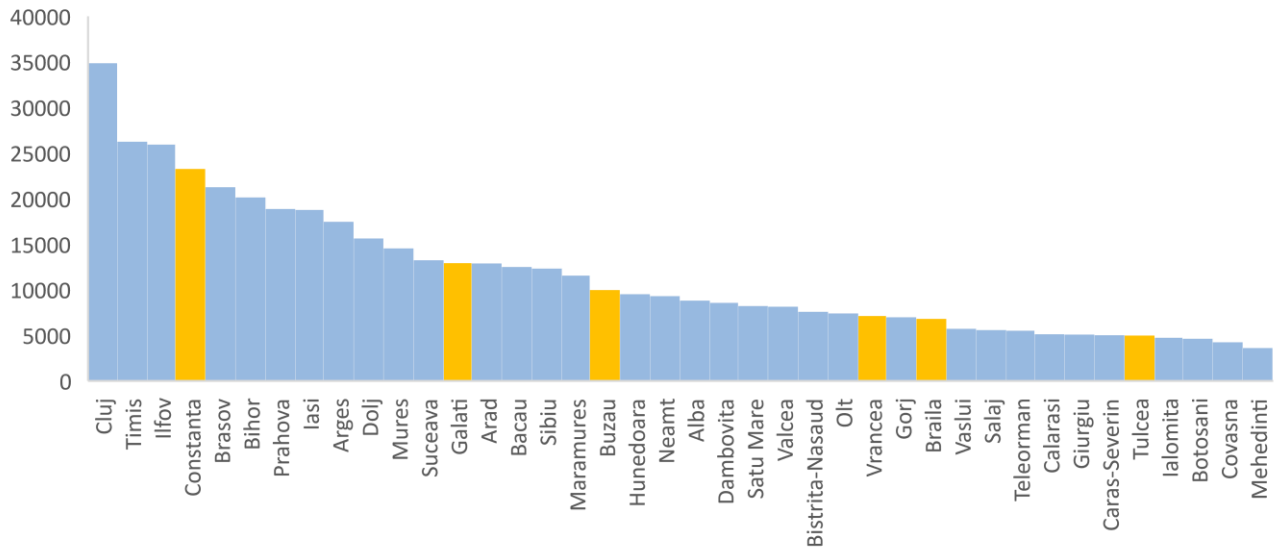
Source: Data processing - National Institute of Statistics 2020

Regarding the dynamics over time of the volume of active local units, the graph below indicates that, in the last 4 years, all development regions of Romania have experienced an incremental increase in the number of active local units. At the level of the South-East Region, in the period 2014-2018, the effective number of active local units increased by no less than 8.4%.

Figure no. 53. Dynamics of the number of local units active at regional level, in the period 2014-2018 (number)
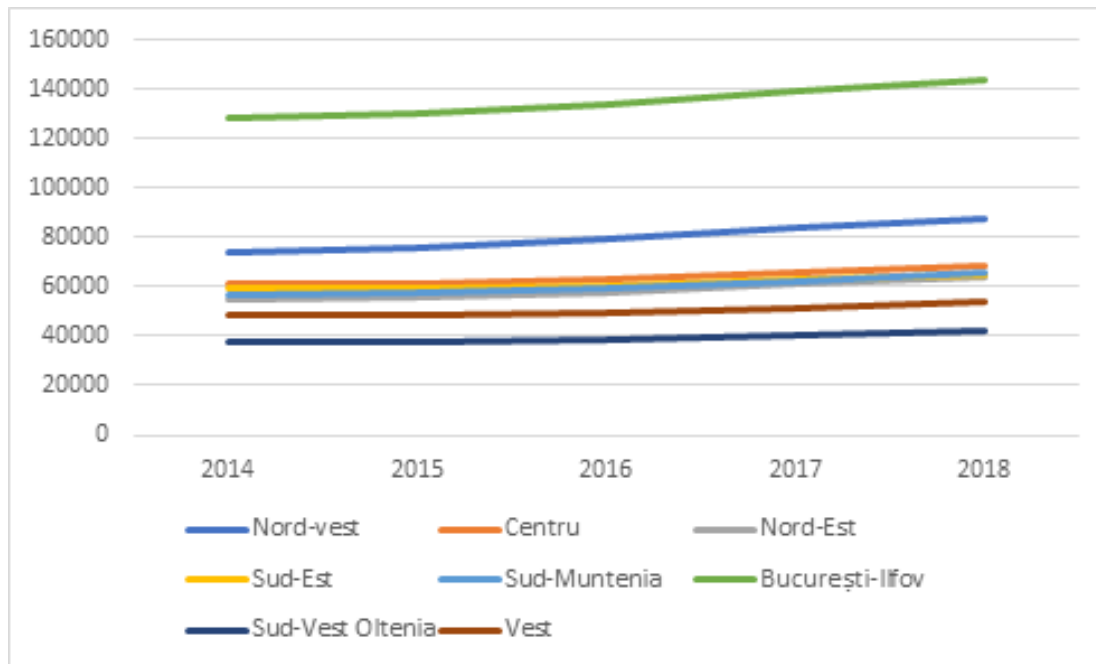
Source: Data processing - National Institute of Statistics 2020

Regarding the evolution of the structure by economic branches of the active local units, it is found that at the level of the South-East Region, although the wholesale and retail industry remained the most important industry in terms of the actual number of active local units, the industry of professional, scientific and technical activities experienced a significant increase in the number of active local units, from 4.473 units in 2014 to 5.407 active units in 2018, representing an increase of 17.28%. The information and communications industry also grew by 21.15% over the same period.

Regarding the analysis of active local units by size classes, the South-East Region registered a slight increase of active local units in the category of micro-enterprises. Indeed, in the size class 0-9 people, the South-East Region is on the 4th place at national level and registered an increase of 9.54% in the period 2014-2018. However, the North-East and South-Muntenia Regions have recovered massively the gaps from South-East Region, and if this growth rate is maintained in the near future, the South-East Region risks ranking 6th nationally.

Figure no. 54. Dynamics of the number of active local units by category 0-9 persons at regional level, in the period 2014-2018 (number)
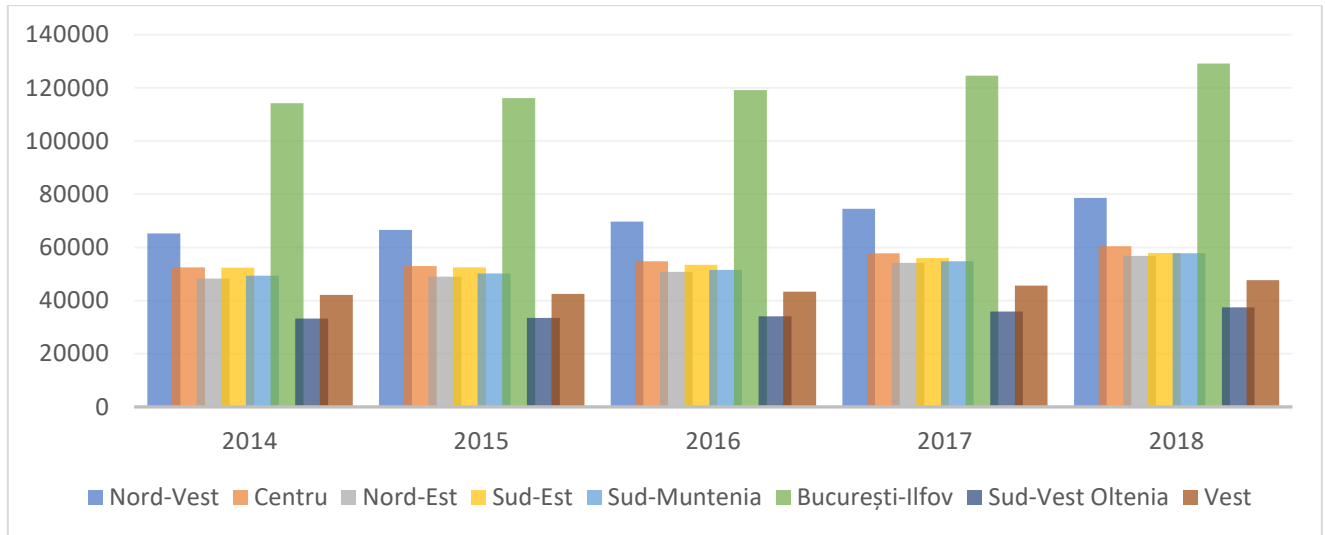
Source: Data processing - National Institute of Statistics 2020

At the level of active local units in the size category 10-49 people, this strong evolution of the North-East and South-Muntenia Regions is more evident as they managed to overtake the South-East Region, in the analyzed time period. If at the level of 2014, within this size category of active local units, the South-East Region was on the 5th place at national level, at the level of 2018 it was on the 6th place, in the context of the accelerated growth of the North-West Region. If in the analyzed period, the North-East Region had increased by 5.6% the number of active local units in the size category 10-49 persons, at the level of the South-East Region, this increase was of only 0.30%.

Figure no. 55. Dynamics of the number of active local units by category 10-49 persons at regional level, in the period 2014-2018 (number)
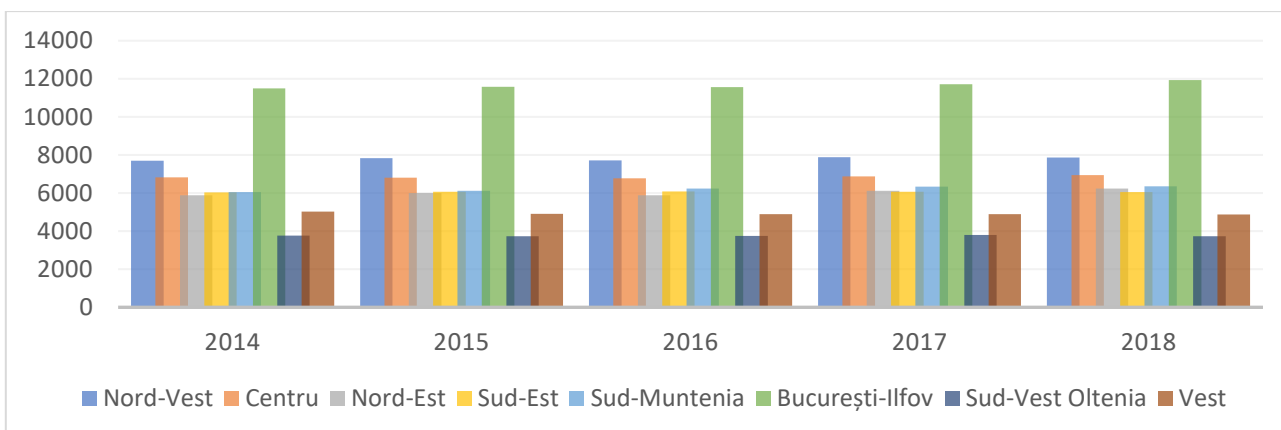
Source: Data processing - National Institute of Statistics 2020

A similar trend can be observed at the level of active local units in the size category 50-249. The South-East Region was overtaken by the North-East Region in the period 2014-2018, which registered a slight increase in local units active during this period. A worrying fact is the decreasing trend of the South-East Region, which lost 4.29% of the active local units registered in 2014.

Figure no. 56. Dynamics of the number of active local units by category 50-249 persons at regional level, in the period 2014-2018 (number)

Source: Data processing - National Institute of Statistics 2020

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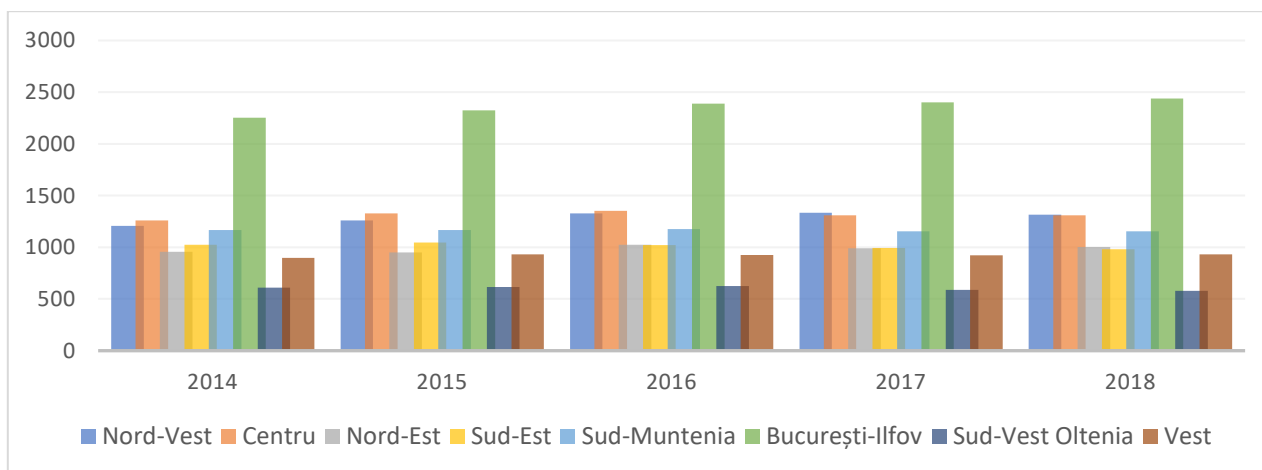
At the level of the last size category, namely the category 250+ people, again the South-East Region is on the 6th place nationally, at the level of 2018. It lost 5.96% of the active local units from this size category during 2014 -2018, being overtaken, again, by the North-East Development Region.

Figure no. 57. Dynamics of the number of active local units by category 250+ people at regional level, in the period 2014-2018 (number)
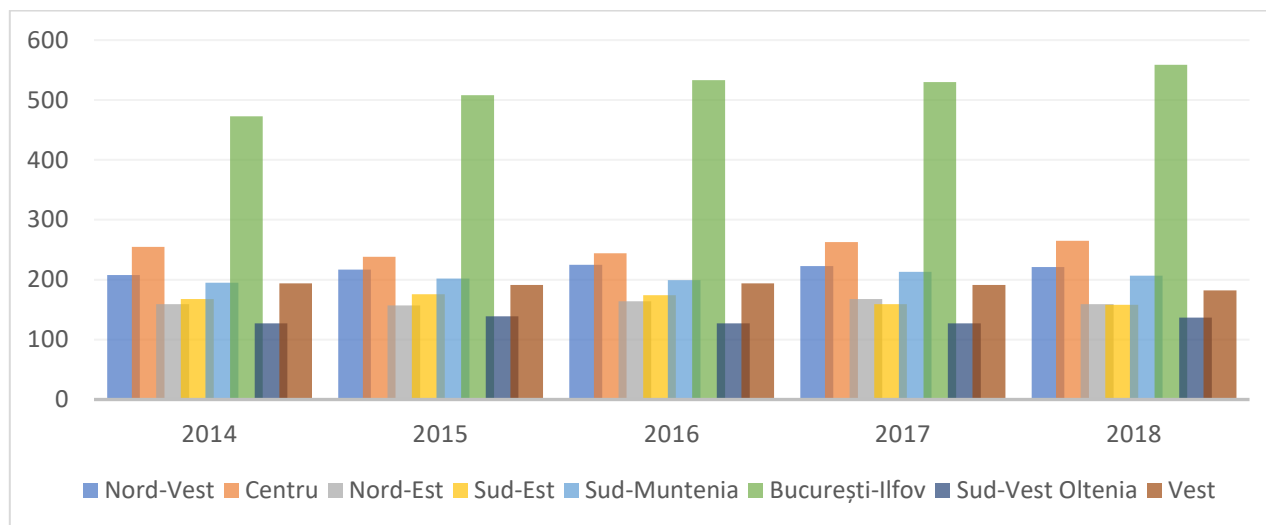
Source: Data processing - National Institute of Statistics 2020

Regarding the evolution of the number of active units according to the economic branches, from the graph below it can be seen that most active units are in wholesale and retail trade; repair of motor vehicles and motorcycles, followed by construction. The evolution of the structure is relatively stable along the analyzed horizon.

Figure no. 58. The evolution of the branch structure of the local units active in the South-East Region, in the period 2014-2018
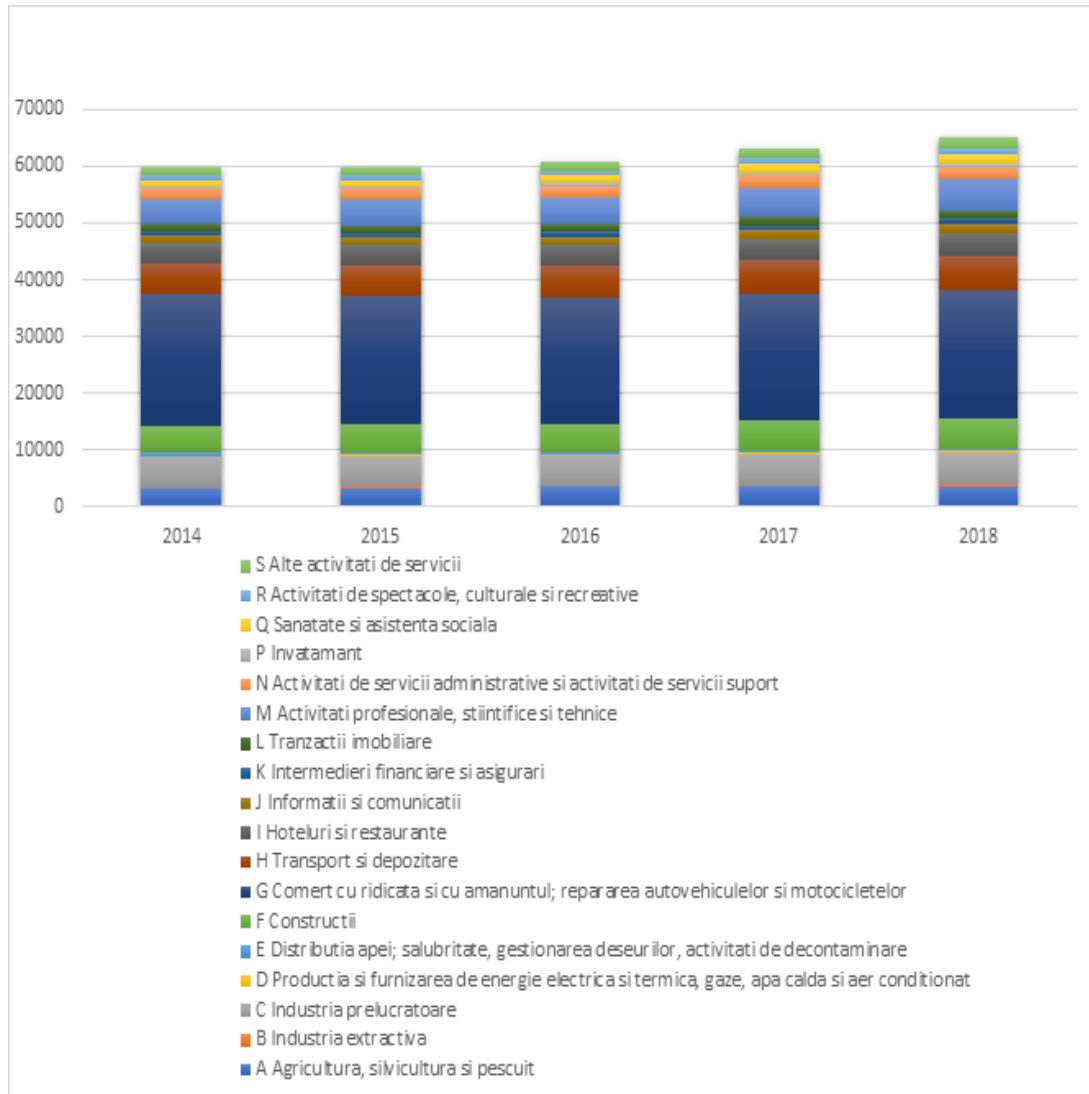
Source: Data processing - National Institute of Statistics 2020

Density of active local units

In order to assess the density of active units, the surface of the component counties of the South-East Region was taken into account, presented in the table below:

Tabel no. 4. The surface of the component counties of the South-East Region

Counties	Surface (km2)
Brăila	4,776
Buzău	6,103
Constanța	7,071
Galați	4,466
Tulcea	8,499
Vrancea	4,857

Source: Data processing - National Institute of Statistics 2020

The density of active units was determined as a ratio between the number of active units and the area at county level, the resulting values being presented in the following table:

Tabel no. 5. Density of active local units, at county level, 2014-2018 (units / square km)

County	2014	2015	2016	2017	2018
Brăila	1.35	1.35	1.34	1.38	1.42
Buzău	1.50	1.51	1.54	1.61	1.63
Constanța	3.03	3.01	3.03	3.18	3.28
Galați	2.60	2.64	2.72	2.80	2.89
Tulcea	0.54	0.54	0.56	0.57	0.58
Vrancea	1.29	1.31	1.33	1.40	1.47

Source: Data processing - National Institute of Statistics 2020

The graph below shows that the most developed counties are Constanța and Galați, and on the last place is Tulcea county. In Constanța, the density of active local units registered a significant increase, amid the increase in the number of active local units, so that in 2018 there were 3.28 active local units / square km, increasing from 3.03 active units / square km, in 2014.

Figure no. 59. Evolution of the density of active local units, at county level, 2014-2018
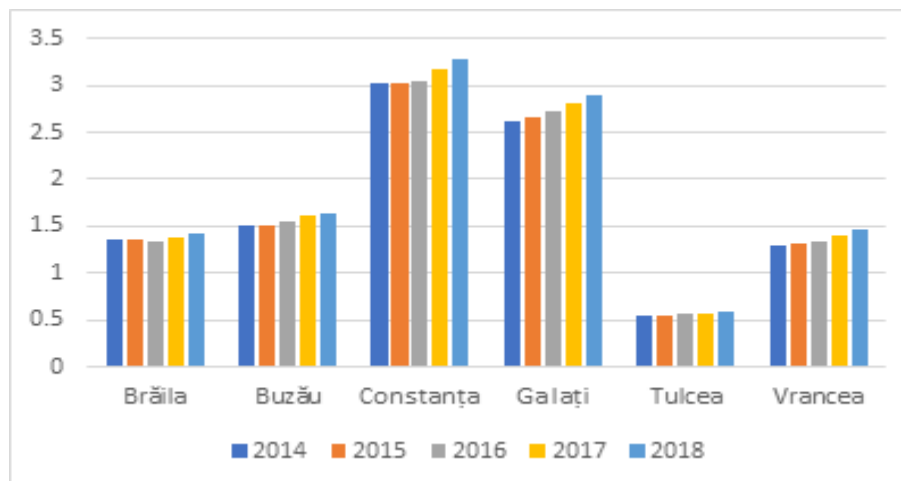
Source: Data processing - National Institute of Statistics 2020

Dynamics of SMEs activity

The main criteria taken into account for classifying an enterprise in one of the three categories (micro, small or medium) are the staff employed and the turnover.

The European Commission's definition of SMEs sets out three categories of small and medium-sized enterprises:

- Micro-enterprises: enterprises with less than 10 employees and an annual turnover or share capital that must not exceed 2 million Euros;
- Small enterprises: enterprises with a number of employees between 10 and 49, as well as an annual turnover or share capital that must not exceed 10 million Euros;
- Medium-sized enterprises: enterprises with a number of employees between 50 and 249 and an annual turnover not exceeding 50 million   Euro (or a share capital which must not exceed 43 million euro).

In Romania, in the period 2014-2018, micro-enterprises predominated, representing 88.88% of all companies in 2014 and increasing to 89.97% in 2018. Instead, small enterprises began to decrease in share at national level. If in 2014, 9.47% of Romanian companies were small enterprises, this share decreased to 8.54% in 2018. Medium enterprises have the lowest share of total enterprises nationwide (1.66% in 2014, decreasing to 1.49% in 2018).

Figure no. 60. The share of SMEs by regions in the total number of SMEs at national level, 2014-2018
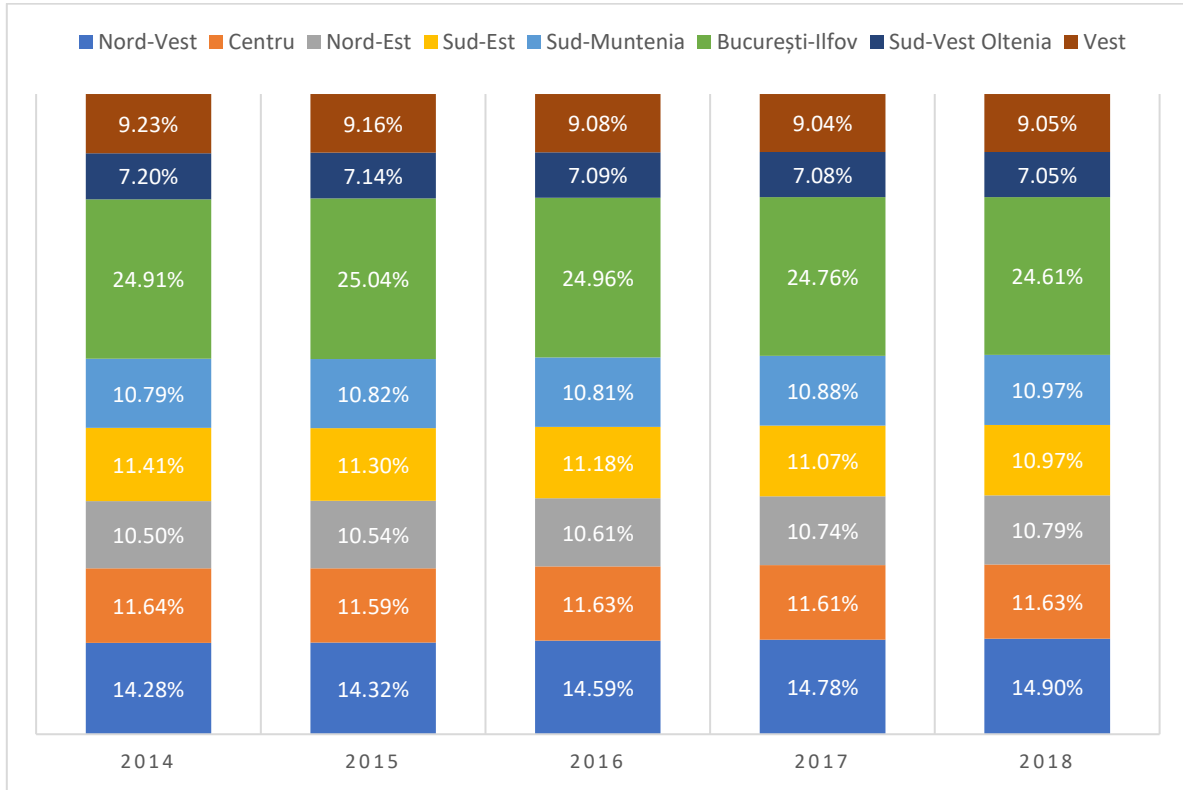
Source: Data processing - National Institute of Statistics 2020

In 2014, most enterprises were in the Bucharest-Ilfov Region, in proportion of 24.91%, in 2018 there being observed a slight decrease, so that the share of enterprises reached 24.61%. At the opposite pole is the South-West Oltenia Region, with a share of SMEs of only 7.05% in 2018, decreasing compared to 2014, when the share was 7.20%. The South-East Region registered a slight decrease in the number of SMEs in the period 2014-2018. If in 2014, it registered a percentage of 11.41% of the total number of SMEs at national level, at the level of 2018, this share had decreased to 10.97%.

It is observed that, in general, the trend is an ascending one for each county and category of SMEs.

In addition, most companies are registered in Constanța County, because it is the county that attracts the most business opportunities through the presence of highway, port, airport, Black Sea coast, universities and trained workforce.

Number of newly created enterprises (creation of start-ups), rates of creation of active local units

Newly created enterprises include companies and individual entrepreneurs (individuals, individual enterprises, family businesses, liberal professions) who carry out non-agricultural activities, created in

a certain period of time. The notion of "new creation" refers to the inclusion of an enterprise in the enterprise's statistical register, which is updated monthly on the basis of the fiscal register.

Figure no. 61. Evolution over time of newly created active enterprises in the South-East Region (2014-2018, number)
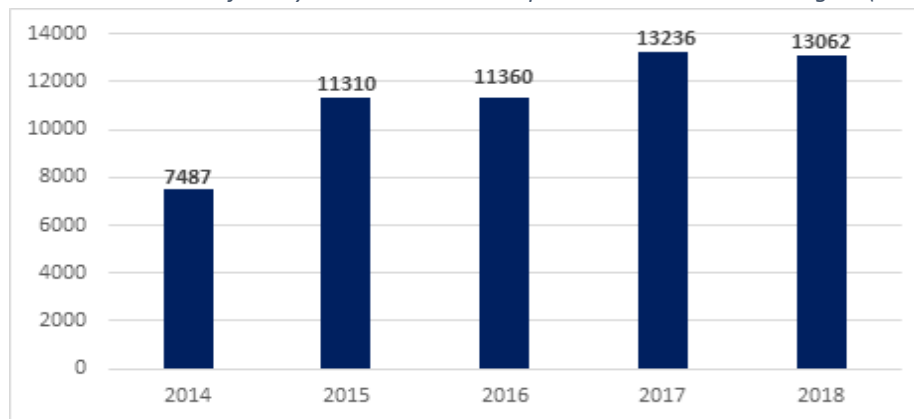
Source: Data processing - National Institute of Statistics 2020

In the period 2014-2018, the South-East Region experienced a significant increase in the registration of new active enterprises. If in 2014 there were 7,487 newly created enterprises, in 2018 13,062 new enterprises were established, representing an increase of 42.69% in the analyzed time period. Overall, the South-East Region has maintained its national growth rate. As can be seen, the number of newly created enterprises at national level decreased in the period 2017-2018, a similar trend being noticed in the South-East Region.

Figure no. 62. Creation rate of active enterprises (2014-2018, percentage)
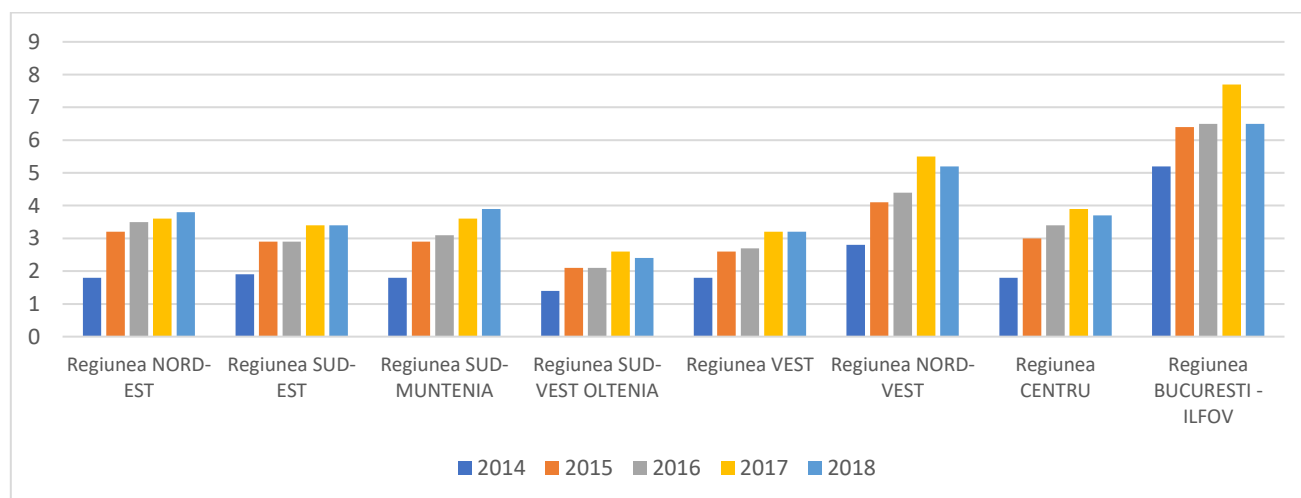
Source: Data processing - National Institute of Statistics 2020

Number of companies deregistered at regional leve

In order to outline an adequate image regarding the situation of the companies' deregistration at the level of the South-East Region, data were collected from the National Trade Register Office, for the period 2014-2020. At the time of this analysis, the data provided by the National Trade Register Office were up to date until August 2020. Considering the incomplete data for the current year, the analysis of the dynamics of the deregistration of the companies at regional and county level, respectively, was performed for the period 2014-2019. Although the number of deregistered companies has constantly increased at the level of the region, in the period 2014-2016, the Region experienced a decrease. If between 2014 and 2016 the number of deregistrations at the regional level had increased by 13.51%, in the next two years there was a significant decrease. Thus, the number of deregistered companies decreased, in 2018, by 20.66% compared to 2016, representing an average decrease of 10.33% per year. Starting with 2019, the deregistration trend was again an upward one.

The dynamics of companies deregistration at regional level fluctuate from year to year. If in 2016, the counties of Constanța and Galați had registered a record number of deregistration of companies, this trend decreased in 2017 and 2018, but returned in 2019.

Figure no. 63. Dynamics of deregistration of companies in the South-East Region (number)
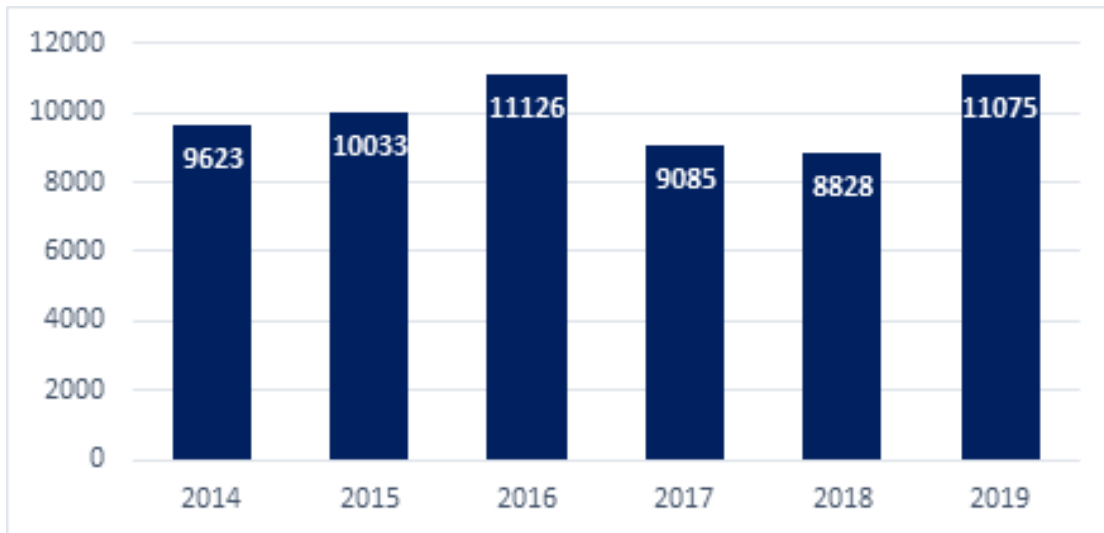
Source: Data processing - the National Trade Register Office 2020

Figure no. 64. Dynamics of deregistration of companies in the counties of the South-East Region (number)
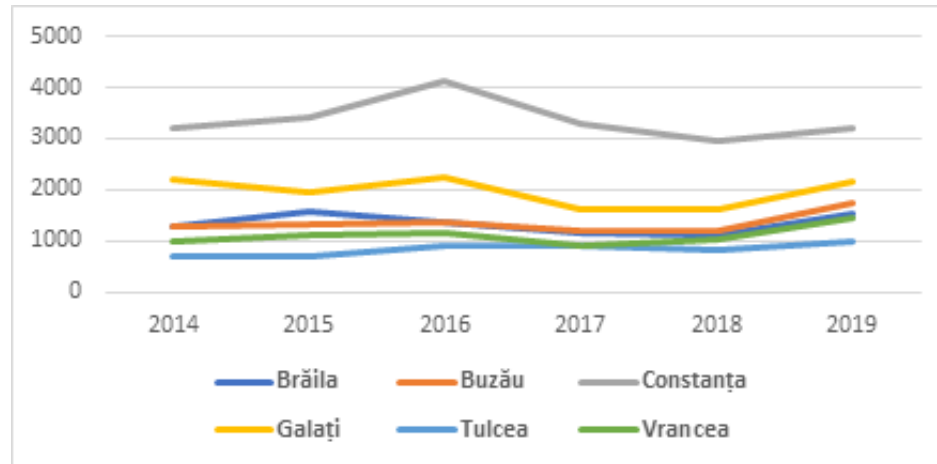
Source: Data processing - the National Trade Register Office 2020

An interesting analysis concerns the situation of deregistrations in August 2020, compared to the same month of 2019. The data show a reduction in the number of deregistered companies by 51.25%, a trend that can be explained, at least in part, by the economic effects generated by the government measures taken in the context of the SARS COV 2 pandemic.

Figure no. 65. Number of companies deregistered in the South-East Region, August 2019 vs August 2020
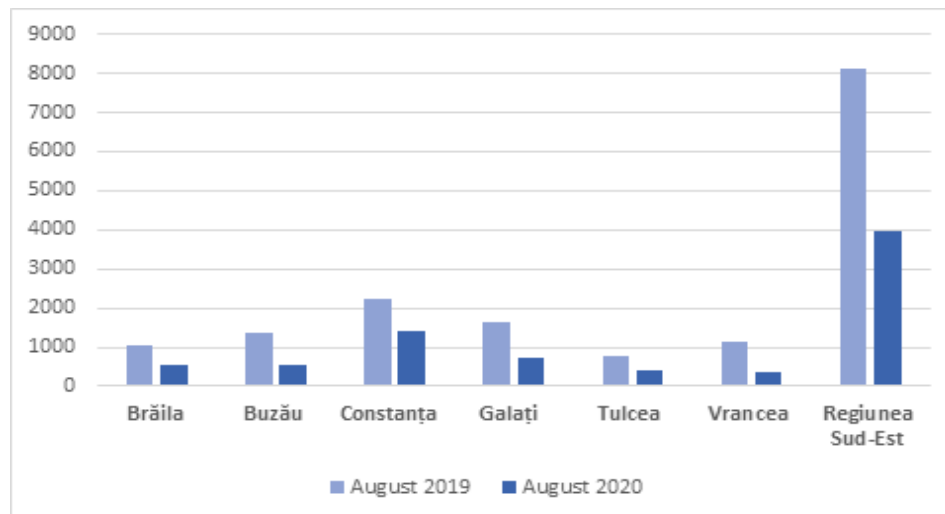
Source: Data processing - the National Trade Register Office 2020

The average number of employees by economic branches

Next, the average number of employees by economic branches[12] indicator will be presented, whose impact could be observed both at the level of labour market dynamic and at the level of the entrepreneurship from the region.

At national level, the average number of employees during the period of 2014-2019 had an increasing tendency, increasing from 4.507.729 persons in 2014, to 5.164.471 persons in the last analysed year (representing an increase of 14.5 percentage points).

Figure no. 66. Average number of employees at national level (2014 - 2019) (MU thousand people)

4507729   4611395   4759419   5068063   5164471
                                   4945868

2014   2015   2016   2017   2018   2019
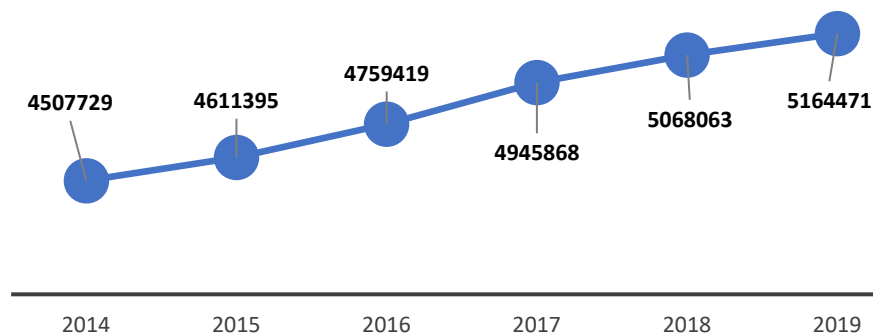
Source: Data processing - National Institute of Statistics 2020

Thus, it can be observed that the average number of employees on national level has an ascending trajectory between 2014-2019, which can also be noticed in the descending dynamic of the unemployment rate, that was recorded on national level, in the same analysed period.

Analyzing the data at regional level, it is noted that the region with the highest number of employees is still the Bucharest-Ilfov Region, with a total average number of 1,136,462 people, in 2019. The next in the ranking are the North-West Region, with a number of 704,752 employees, in 2019, and the Center Region, with 659,101 employees, in the same year. The region positioned on the last place from this point of view is the South-West Oltenia Region (405,867 employees), followed by the West Region (527,827 people).

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[12] According to INS, the average number of employees includes the persons that are hired with a determined/undetermined contract (including the seasonal workers, the manager or the administrator), whose contract was not suspended in the reference period. The average number is determined as a simple arithmetic average, resulting from the sum of daily number of employees, divided by the total number of calendar days. Only the persons who have been paid are included in the number of employees calculated in the average number.

The South-East Region take the 5th place on national level, with an average number of 554,174 employees, representing 11.07% from the total existing number in Romania. Analysing the evolution of the tendency for this indicator, it could be noticed an improvement starting with 2014, year that was preceded by a period of negative fluctuations between 2010-2012 due to the economic crisis.

Figure no. 67. Average number of employees by Development Regions (2014 - 2019), (MU thousands of people)
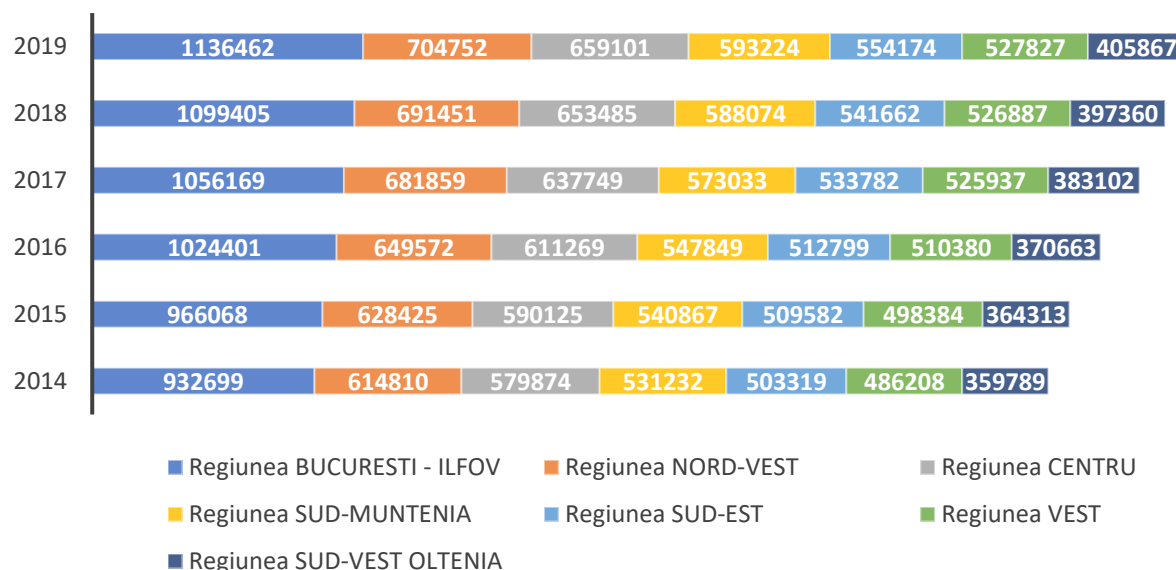
Source: Data processing - National Institute of Statistics 2020

Analysing the contribution of every county to the total number of employees in the region, it could be observed a slight increase at the level of all counties of the region compared with the previous year, except for Braila county, where the number of employees decreased from 69,127 in 2018 to 68,647 in 2019 (representing just a percentage decrease of 0.69%). However, the county with the highest average number of employees between 2014-2019 is represented by Constanța (181,817 persons), followed by Galați (110,644). The counties placed on the bottom of the rankings in terms of number of employees are Tulcea (46,786) and Vrancea (57,612).

Figure no. 68. The average number of employees in the South-East Region, distributed by counties (2014 - 2019), (MU thousands of people)
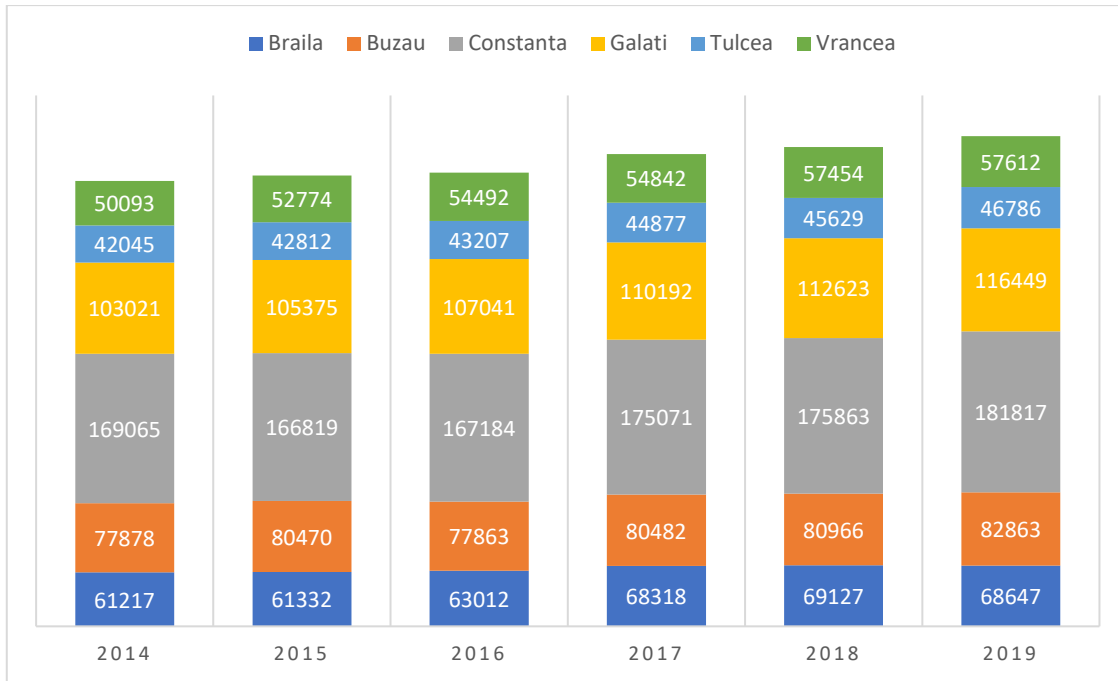
Source: Data processing - National Institute of Statistics 2020

From the perspective of the economic sectors analysis, it can be observed that in South-East Region, the highest number of employees is in the sector of water distribution, sanitation, waste management and decontamination activities, with a total number of 15,443 persons.

Also, in 2019, the activities of agriculture, forestry and fishing summed up a total of 19,138 employees in South-East Region, placing it on the 2nd place on national level, after South Muntenia Region.

The branch of hotel and restaurant services places the South-East region on the 2nd place by the average number of employees at the end of 2019, from which a percentage of 55% consists of employees from Constanța county.

The counties that have the highest number of employees in agriculture, forestry and fishing in South-East Region, are Constanța (4.106), Buzău (4.041) and Brăila (3.908). Another economic sector where the South-East Region recorded a high number of employees is the sector of producing and providing electricity and heat, hot water and air conditioning. The South-East Region takes the 3rd place in 2019, behind South-West and Bucharest-Ilfov Regions, with a number of 7,915 employees.

The division of the average number of employees by sex, on regional level, is at follows

- The male population has a higher percentage in the total number of employees (52.4%), compared with the female population (47.6%);
- Most employees are hired in the Bucharest-Ilfov Development Region (601,864 males and 534,598 females), while the South-East Region takes the 6th place on national level taking into consideration the number of male employees (289,467), respectively the 7th place considering the number of female employees (264,467).

Regarding the distribution of the average number of employees on the level of South-East Region counties, the highest percentage of both female and male employees is recorded by Constanța (having in 2019, 96,541 male employees and 85,276 female employees). In almost all counties, the number of male employees is higher than the number of female employees, except Vrancea county, where the female employees (26,716) are more numerous than the male employees (26,058).

In order to carry out an analysis of the economic context of the South-East Region, it is also necessary to analyze the evolution of the **monthly average net salary, including by economic activities**[13], as well as the **average salary earnings**[14].

This way, on national level, a constant evolution is noticed regarding the monthly net average salary for the entire analysed period. Regarding the level of monthly average salary earning, this was in 2014 1,697 lei (net), while in 2019 its value reached 2,986 lei (net). From this perspective, it can be observed, as stated below in the linear chart, an increase of salary earning on national level with 1,289 lei compared to the start of the reference period.

Figure no. 69. Monthly average net salary, at national level
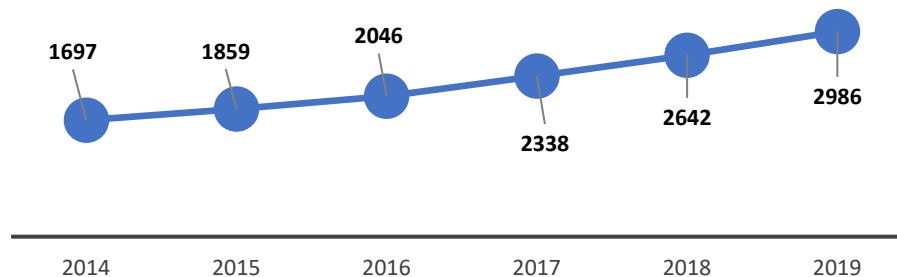
Source: Data processing - National Institute of Statistics 2020

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[13] The monthly average net salary is obtained by deducting from the gross nominal earnings, the contribution of employees to social health insurance, the individual contribution of state social insurance and the contribution of employees to the unemployment insurance budget.

[14] The average net monthly earnings represent the ratio between the net amounts paid to employees by economic agents in the reference month, regardless of the period for which they are due, and the average number of employees.

Regarding the regional level, the monthly average salary earning has the same ascending tendency. The regions with the highest salary level in 2019 are Bucharest-Ilfov Region with 3,947 lei, West Region with 2,879 lei, followed by Nord-East Region with 2,781 lei. According to the below chart, the least developed regions regarding the salary earning are South-East Region with 2,551 lei and South-West Region with 2,630 lei.

For the South-East Region, the value of monthly average net salary in 2019 has a value of 85.4% from the value of monthly average net salary on national level, which ranks the South-East Region under the national average.

Figure no. 70. Monthly average net salary, by development regions (2014 - 2019), (MU thousand lei)
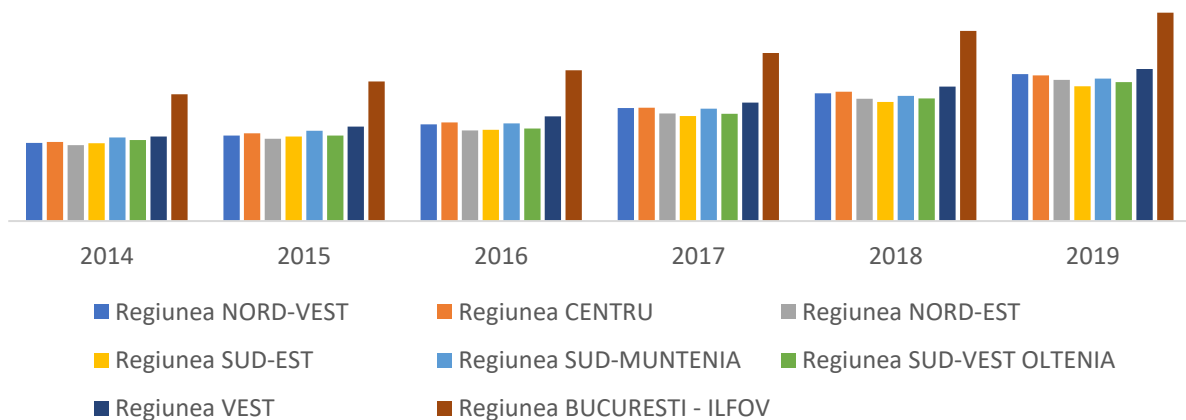
Legend:
- Regiunea NORD-VEST
- Regiunea CENTRU
- Regiunea NORD-EST
- Regiunea SUD-EST
- Regiunea SUD-MUNTENIA
- Regiunea SUD-VEST OLTENIA
- Regiunea VEST
- Regiunea BUCURESTI - ILFOV

Source: Data processing - National Institute of Statistics 2020

From the perspective of the evolution of the monthly average salary, at the level of South-East Region counties, between 2014-2019, it can be noticed an increase of these values for each county. According to the below charts, the counties with the highest salary level in 2019 were Constanta, Galati and Tulcea. The county with the lowest level of monthly average salary level at the end of 2019 was Vrancea with 2,389 lei net, followed by Braila and Buzau, with 2,428 lei net and 2,450 lei net.

Figure no. 71. Monthly average net salary, at the level of the counties of the South-East Region (2014 - 2019), (MU thousand lei)
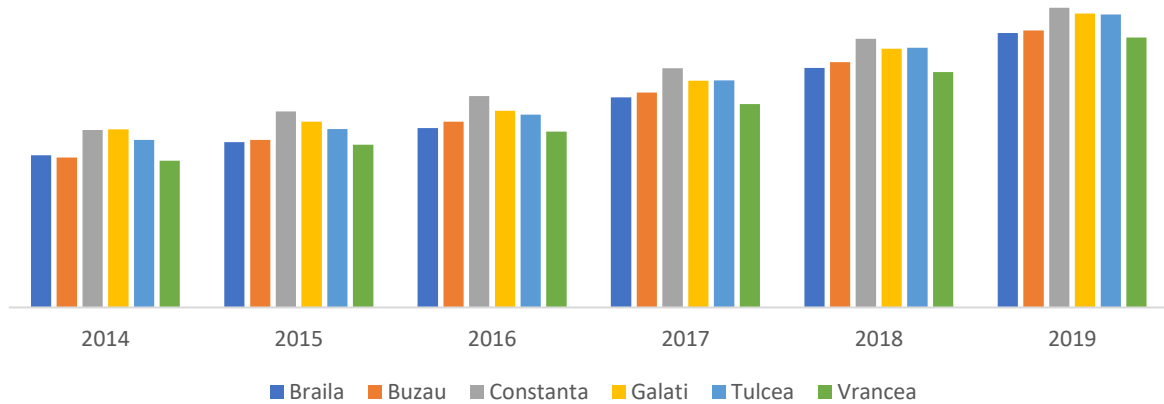
Source: Data processing - National Institute of Statistics 2020

From the analysis of salary earnings by economic branches, at the level of South-East Region, it can be seen that the sector with the highest value of monthly average salary in 2019 was the sector of producing and providing electricity and heat, gas, hot water and air conditioning. This sector has a monthly average salary level of 5,093 lei net.

The other domains that register a superior salary level on regional level are part of the sectors of public administration of defense and public system of social insurances, with a monthly average salary of 4,559 lei net, of extractive industry, with a month average salary of 3,559 lei net and health sector with 3,515 lei net.

The lowest values of salary earning were recorded in the sector of hotels and restaurants with 1,544 lei net, other services category with 1,614 lei net and activities for administrative services and supportive services with 1,765 lei net.

Figure no. 72. Average salary earnings by activities of the national economy by counties
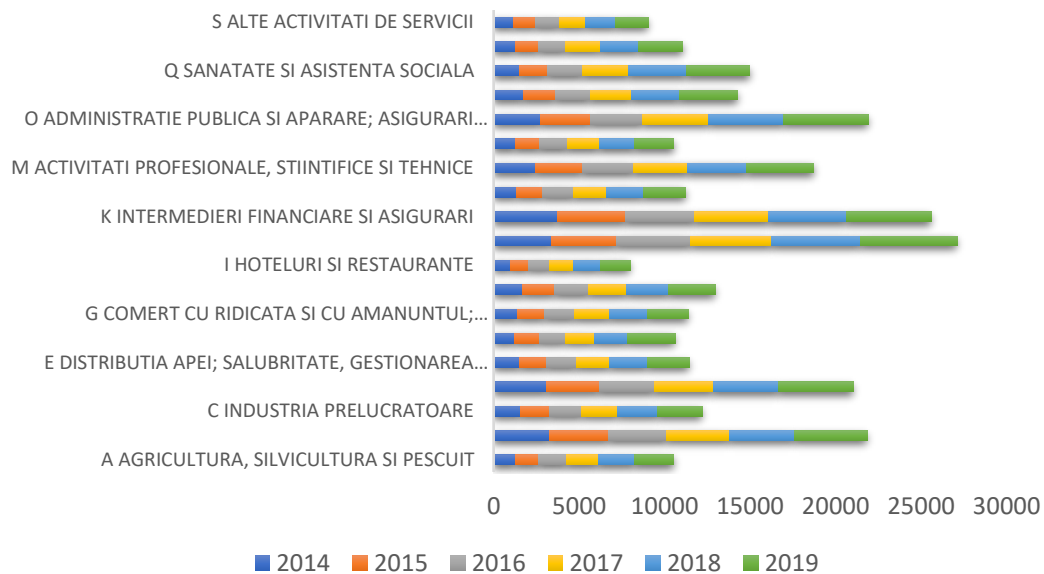
Source: Data processing - National Institute of Statistics 2020

Work productivity

Labor productivity is an important indicator in highlighting the efficiency of labor use. Work productivity can be calculated at the level of economic agent, branch, national economy. In general, productivity is the difference between the resources invested and the results obtained in a given activity.

Depending on the utility pursued, there are numerous formulas for calculating work productivity. In this study, in order to have a unit value of work productivity, it was calculated according to the definition of the National Institute of Statistics (NIS), by reporting the gross value added to the number of people employed, respectively to the number of hours worked. The employed population includes all persons - both employees and self-employed - engaged in production activities that fall within the limits of production in national accounts.

The factors on which productivity depends are, in general, natural factors such as: resource availability, climate conditions, etc., technical and economic factors, such as: degree of technical endowment, organizational management, social factors, such as: level of professional training employees, and international factors.

At national level, work productivity per person employed is on a slightly upward trend, influenced in particular by a higher work productivity in real estate transactions, financial intermediation and insurance and information and communications.

Tabel no. 6. Work productivity per person employed at national level, total and by activities of the national economy, 2014-2018

CANE Rev.2 (activities of the national economy)	Years				
	2014	2015	2016	2017	2018
	MU: Lei / person				
	Lei / person	Lei / person	Lei / person	Lei / person	Lei / person
TOTAL	68537.9	73481.5	81424.1	89980.8	99494.6
Agriculture, forestry and fishing	12485.2	13250	15465.4	18356.8	20973.6
Extractive industry; manufacturing industry; production and supply of electricity and heat, gas, hot water and air conditioning; waste, decontamination activities	92346.2	96221.6	100228	107780	113821.9
Constructions	65777.6	66181.7	68631.1	63544.5	77265.7
Wholesale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	58698.9	67577.9	73839.2	83322	87414.1
Information and communications	220179.1	210245.9	235013.9	254372	277206.2
Financial intermediation and insurance	217883.5	223058.2	239482.5	184545.3	215915.1
Real estate transactions	1822563.8	1905849.1	2243946.4	2993887	2783578.1
Professional, scientific and technical activities; administrative service activities and support service activities	117462.5	137490.1	139821.4	168410.8	187856.1
Public administration and defense; social insurance in the public system; education; health and social assistance	73339.6	60150.2	75366.7	89255.5	108936.3
Entertainment, cultural and recreational activities; repairs of household products and other services	80689.9	96205.5	90941.3	108984.5	128630.8

Source: Data processing - National Institute of Statistics 2020

Analyzing the work productivity at national level, we notice that there is a very large disparity between labor productivity in real estate transactions and other activities of the economy, justified by the very high gross value added in this area compared to other areas of activity. The lowest work productivity is registered in agriculture, forestry and fishing activities where the lack of technology, climatic conditions, lack of labor qualification put their mark on this indicator. Analyzing the work productivity in dynamics,

we note that between 2014 and 2018, the work productivity increased in all areas of activity, except for a reduction in productivity between 2017 and 2018 in the field of real estate transactions.

Regarding the hourly work productivity, in the period 2014 - 2018 there is an increasing trend for all fields of activity. Total hourly productivity increased by 45.8%, from 38.2 lei / hour in 2014, to 55.7 lei / hour in 2018. Among the areas with the highest increases in hourly labor productivity are: agriculture, forestry and fishing (74%), from 8.1 lei / hour in 2014 to 14.1 lei / hour in 2018; real estate transactions (48.3%) from 928 lei / hour in 2014, to 1,376 lei / hour in 2018; information and communications (27%) from 120,7 lei / hour in 2014 to 153,1 lei / hour in 2018. In the analysed period 2014 - 2018 there were also decreases in hourly labor productivity, in 2017, in the fields construction and financial intermediation and insurance.

Figure no. 73. Work productivity, per employed person, total and by activities of the national economy, 2014 - 2018
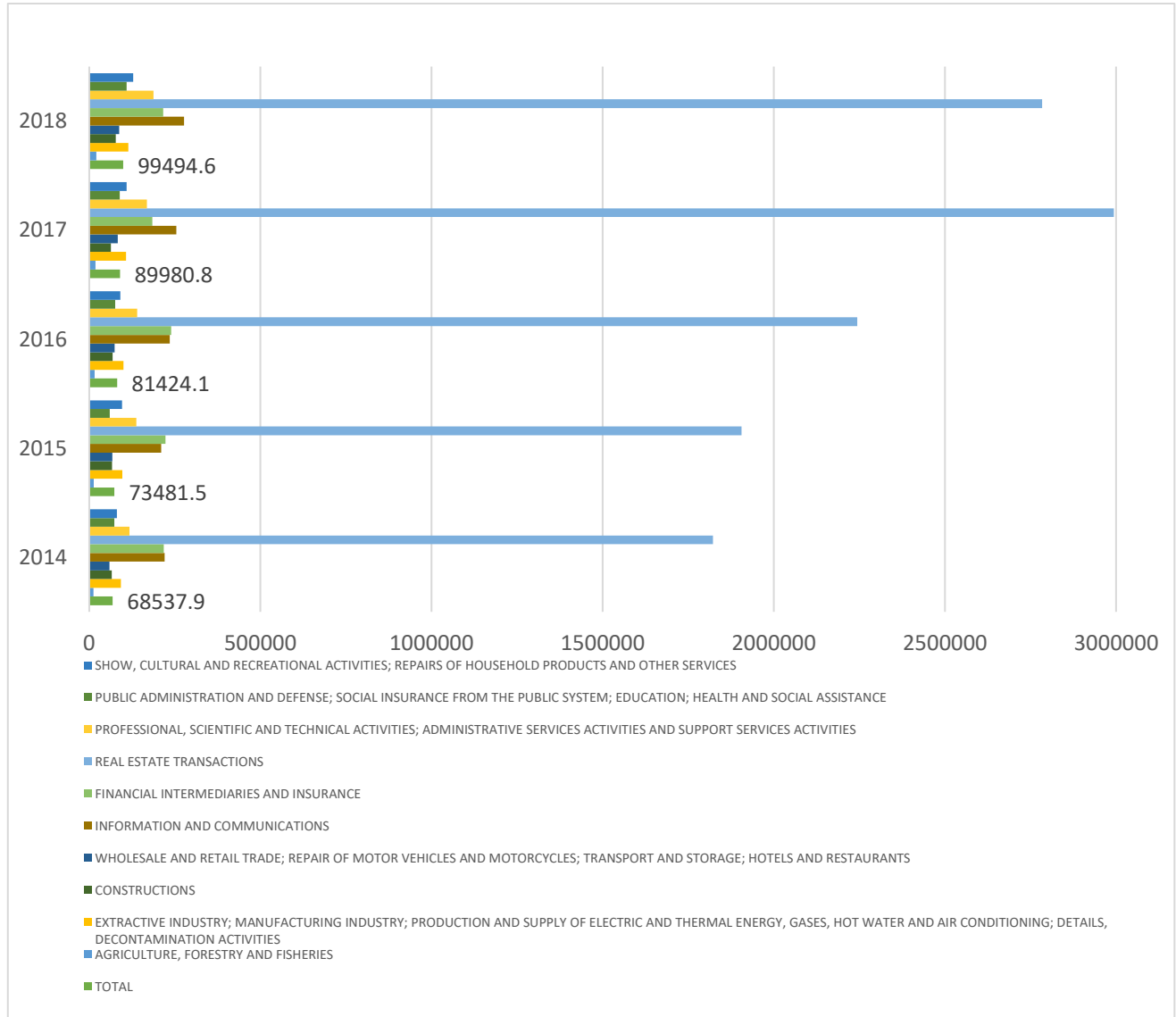
Source: Data processing - National Institute of Statistics 2020

Tabel no. 7. Work productivity, by activities of the national economy CANE Rev.2

CANE Rev.2 (activities of the national economy)	Ani				
	Anul 2014	Anul 2015	Anul 2016	Anul 2017	Anul 2018
	UM: Lei / oră				
	Lei / oră	Lei / oră	Lei / oră	Lei / oră	Lei / oră
Total	38.2	41.2	45	50.4	55.7
Agriculture, forestry and fishing	8.1	8.8	10.2	12.3	14.1
Extractive industry; manufacturing industry; production and supply of electricity and heat, gas, hot water and air conditioning; waste, decontamination activities	48.6	51.1	52.9	58.1	61.4
Constructions	34.7	35.1	35.9	32.9	40
Wholesale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	30.5	35.4	38.4	43.5	45.6
Information and communications	120.7	113.6	126.2	140.6	153.1
Financial intermediation and insurance	117.9	118.2	127.5	100.7	117.8
Real estate transactions	927.8	971.4	1135.7	1476.3	1376.1
Professional, scientific and technical activities; administrative service activities and support service activities	61.3	71.3	72.7	88.2	98.4
Public administration and defense; social insurance in the public system; education; health and social assistance	39.5	32.5	40.3	49.1	59.9
Entertainment, cultural and recreational activities; repairs of household products and other services	44	51.6	49.4	59.6	70.4

Source: Data processing - National Institute of Statistics 2020

At regional level, the available data allow us to calculate work productivity per employed person, as a ratio between gross value added and employed population. Thus, in the analysed period 2013 - 2017 (available data stop at the level of 2017), all regions experienced a sharp increase in labor productivity per person employed, generated both by the increase in regional gross value added, but also by a decrease in population occupied, especially in the South-West Oltenia, South-East or North-East Regions. As a percentage, between 2013 and 2017, the largest increases in labor productivity per person employed took place in the North-West (52%) and North-East (50%) Regions, and the smallest increase was recorded in the Bucharest–Ilfov Region (28%). However, the Bucharest-Ilfov Region leads detachedly in terms of labor productivity at national level.

We specify that, at regional level, a total work productivity was calculated, undifferentiated by branches of activity. There are branches of activity in which work productivity is higher or lower, strongly influenced by factors such as technological progress, the type and size of companies or the organization of work. For the South-East Region we will analyze both the total labor productivity and by categories of activities of the national economy, at the level of CANE Rev.2 section.

Tabel no. 8. Work productivity, per employed person, at regional level, 2013 - 2017, lei / pers.

Development Region	2013	2014	2015	2016	2017
NORTH-WEST Region	52913.64	57199.34255	60999.06	69140.07	80429.39
CENTER Region	59413.53	63200.11691	67293.69	74800.71	83878.95
NORTH-EAST Region	47783.33	50698.18675	54773.8	62139.86	71522.82
SOUTH-EAST Region	62881.26	67531.51601	69074.82	75785.55	83786.65
SOUTH-MUNTENIA Region	58387.41	67137.2874	68118.82	76645.77	82902.61
BUCHAREST - ILFOV Region	120190.5	125748.7842	136480.7	136994.2	154179.1
SOUTH-WEST OLTENIA Region	50773.8	52815.06513	58188.14	65240.12	75446.11
WEST Region	63563.54	65085.75182	70673.02	79833.93	88214.09

Source: Data processing - National Institute of Statistics 2020

Figure no. 74. Work productivity, per employed person, at regional level, 2013 - 2017, lei / pers.
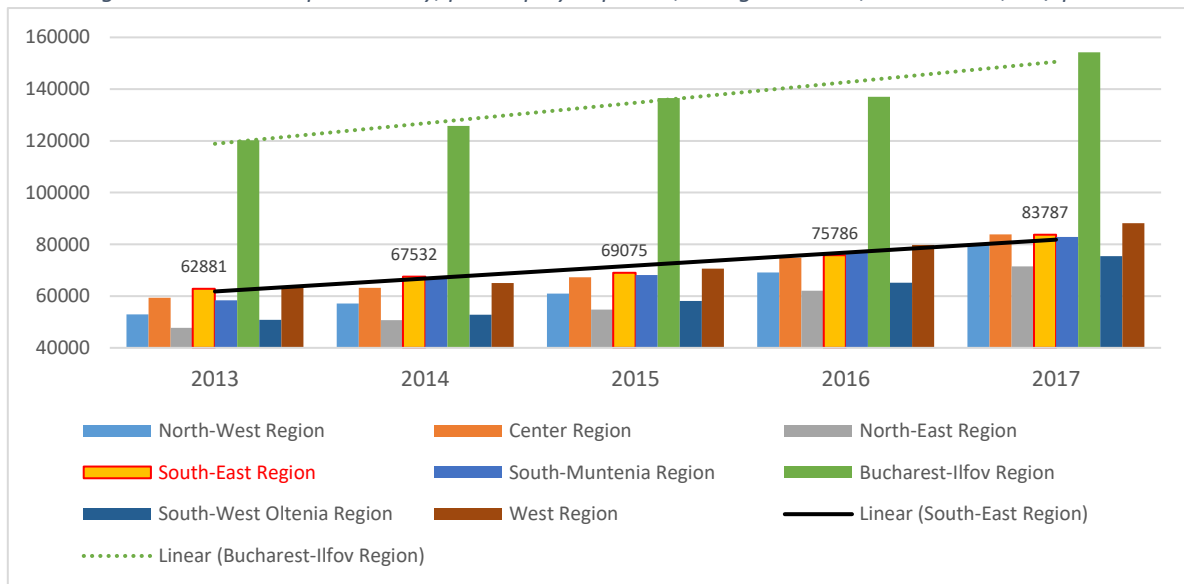
Source: Data processing - National Institute of Statistics 2020

At the level of the South-East Region, the evolution of work productivity per employed person, by activities of the national economy is presented in the table below and separately, in graphs. For 2017, the last year for which data are available, we also represented graphically the work productivity by economic activities, being able to observe a much higher productivity in the activity of real estate transactions compared to all other activities and a very low productivity in agriculture, forestry and fishing, an activity which, moreover, is very well represented in the South-East Region.

Tabel no. 9. Work productivity, per employed person, South-East Region, 2013 - 2017, lei / pers.

CANE Rev.2 (activities of the national economy)	2013	2014	2015	2016	2017
	Lei/person	Lei/person	Lei/person	Lei/person	Lei/person
Total	62881.26	67531.52	69074.82	75785.55	83786.65
Agriculture, forestry and fishing	18408.15	17124.8	19467.37	23747.79	28050.65
Extractive industry; manufacturing industry; production and supply of electricity and heat, gas, hot water and air conditioning; waste, decontamination activities	107602.3	121686.5	108665.3	110836.4	117688.1
Constructions	70423.87	66577.78	62935.41	64944.51	59906.07
Wholesale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	52914.77	55269.21	62961.23	67539.21	77639.65
Information and communications	116782.2	106855.7	94312.5	84052.63	119525.9
Financial intermediation and insurance	127113.9	119054.1	118776.3	154780.8	126300
Real estate transactions	1514405	2082774	2191065	2087971	2181606
Professional, scientific and technical activities; administrative service activities and support service activities	63895.01	71855.04	73822.84	73527.4	88156.6
Public administration and defense; social insurance in the public system; education; health and social assistance	67257.79	78765.21	68493	83473.35	101159.7
Entertainment, cultural and recreational activities; repairs of household products and other services	53394.65	62507.04	79724.14	70487.97	90900.74

Source: Data processing - National Institute of Statistics 2020

Figure no. 75. Work productivity, per employed person, by CANE Rev.2 activities, South-East Region, 2017, lei / pers.
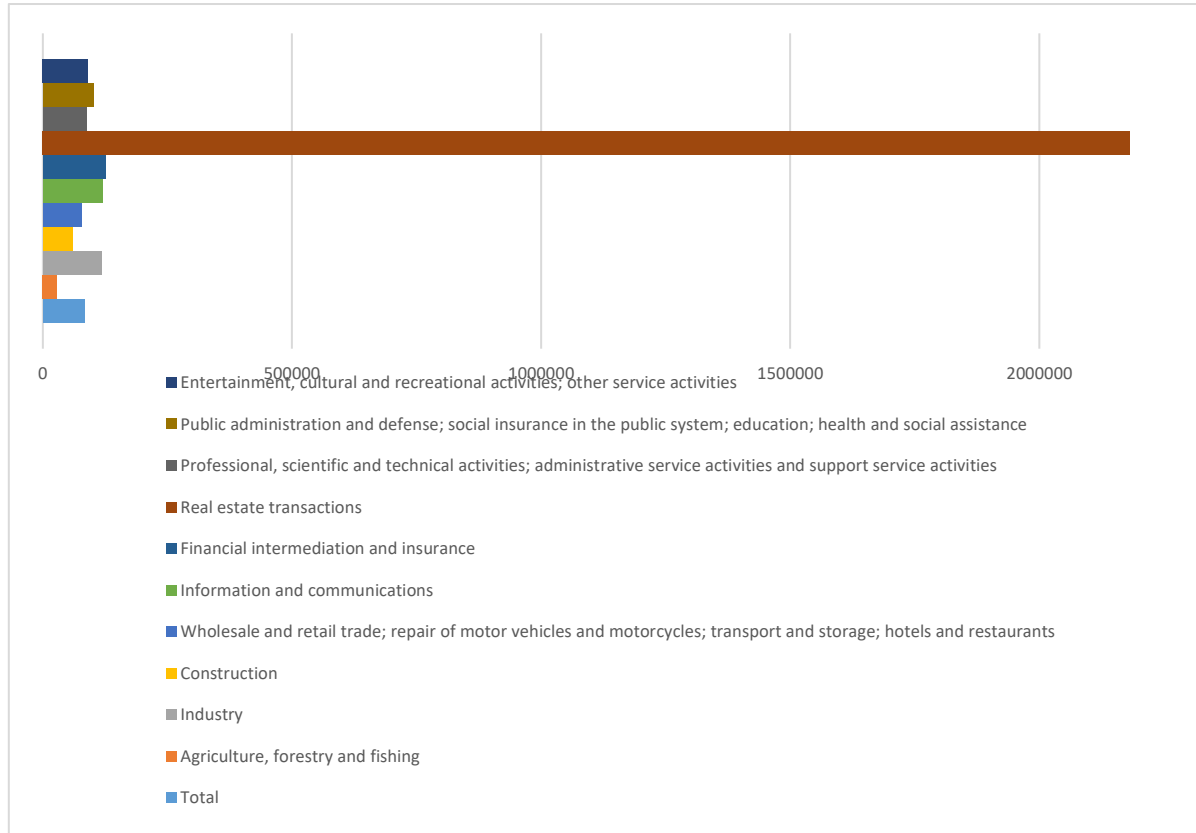
Source: Data processing - National Institute of Statistics 2020

Analyzing the evolution over time of labor productivity in each economic activity, it is observed that, at the level of the South-East Region, between 2013 and 2017, this indicator was on a positive trend for all economic activities, except construction, where, between productivity in 2013 and 2017 is a 15% reduction. The areas with the highest increases in work productivity between 2013 and 2017 were: entertainment, cultural and recreational activities; other service activities (70%); agriculture, forestry and fisheries (52%), public administration and defense; social insurance in the public system; education; health and social assistance (50%). The increasing trend of labor productivity is due to both the increase in gross value added and the decrease in the employed population, with negative effects on the local economy.

Figure no. 76. Work productivity, per employed person, by CANE activities Rev.2, South-East Region, 2013 - 2017, lei / pers.

Financial intermediation and insurance

Professional, scientific and technical activities; administrative service activities and support service activities

Information and communications

Real estate transactions

Public administration and defense; social insurance in the public system; education; health and social assistance

Entertainment, cultural and recreational activities; other service activities

Source: Data processing - National Institute of Statistics 2020

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At county level, the work productivity per person employed was on the same upward trend. As can be seen in the graphical representation, Constanța County has had, in the last 5 years for which we have available data, the highest productivity, starting from 81,217 lei / person in 2013, and reaching 116,042 lei / person. Also, Vrancea County, although has the lowest work productivity in the region, recorded an increase compared to 2013 of 44.5%. The county with the lowest increase in labor productivity in the analyzed period was Galati county, with an increase of only 29.8%. Also at county level, the increase of the work productivity indicator is due both to the increase of the gross added value, but also to the decrease of the employed population in all the analyzed counties.

Tabel no. 10. Work productivity per employed person, South-East Region, at county level, 2013 - 2017, lei / person

	2013	2014	2015	2016	2017
South-East Region	62881.26	67531.52	69074.82	75785.55	83786.65
Brăila	53262.47	54240.60	57435.37	64743.52	72930.43
Buzău	48185.29	48725.84	54264.58	59447.34	67984.19
Constanța	81217.55	103078.19	99772.82	107969.95	116042.91
Galați	57733.23	61084.51	61364.34	66430.61	74985.31
Tulcea	55913.15	55408.48	60001.24	67020.10	76387.58
Vrancea	40892.18	43140.06	47351.93	52700.53	59066.72

Source: Data processing - National Institute of Statistics 2020

Figure no. 77. Work productivity per person employed in the South-East Region and component counties, 2013 - 2017
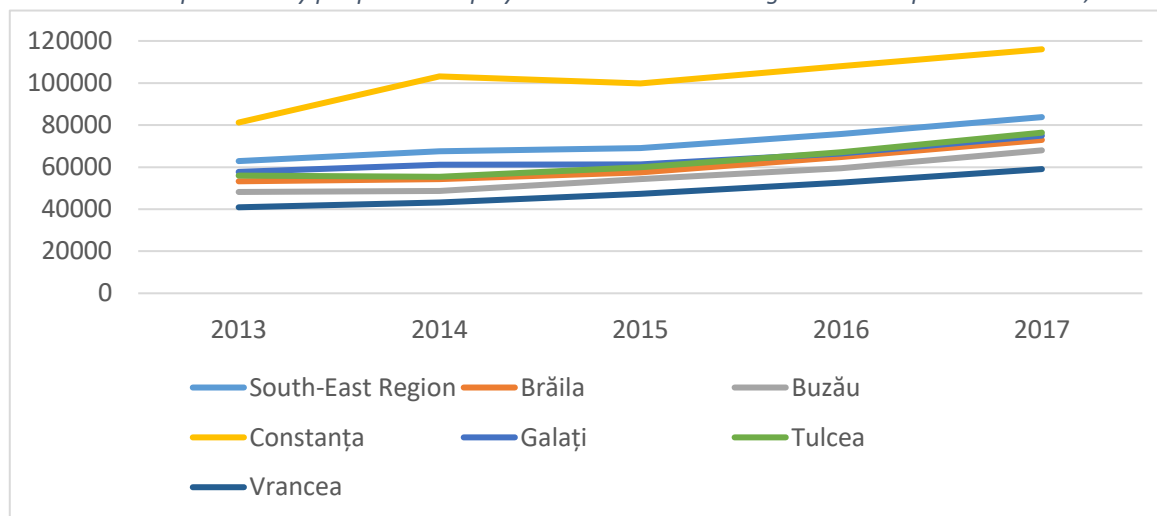
Source: Data processing - National Institute of Statistics (Tempo Online and Regional National Accounts) 2020

Table no. 11. Labor productivity per person employed at county level, by activities of the national economy, 2017

NACE Rev.2 (activities of the national economy)	Brăila	Buzău	Constanța	Galați	Tulcea	Vrancea
Agriculture, forestry and fishing	48761.40	21871.70	27929.18	26102.80	41424.78	17566.08
Extractive industry; manufacturing industry; production and supply of electricity and heat, gas, hot water and air conditioning; waste, decontamination activities	67201.34	82470.59	234000.00	97318.18	80438.60	61806.23
Construction	53292.86	60633.80	66247.06	60469.88	52741.38	50112.24
Wholesale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	77135.37	64495.36	92195.83	27619.25	67728.40	64227.07
Information and communications	165125.00	119714.29	118404.26	114833.33	136363.64	92000.00
Financial intermediation and insurance	116888.89	131400.00	134920.00	114714.29	121000.00	127285.71
Real estate transactions	966250.00	4280000.00	2164000.00	1181857.14	3096000.00	3509000.00
Professional, scientific and technical activities; administrative service activities and support service activities	85744.68	86188.68	85500.00	94446.43	96766.67	80081.08
Public administration and defense; social insurance in the public system; education; health and social assistance	100283.69	101601.23	103297.21	102065.79	104076.92	93449.66
Entertainment, cultural and recreational activities; repairs of household products and other services	110937.50	79566.67	107882.98	77472.73	64444.44	82640.00

Source: Data processing – National Institute of Statistics (Tempo Online) 2020

Figure no. 78. Labor productivity per person employed at county level, by activities of the national economy, 2017

Agriculture, forestry and fishing

Brăila: 48761.4
Buzău: 21871.7
Constanța: 27929.18
Galați: 26102.8
Tulcea: 41424.78
Vrancea: 17566.08

Construction

Brăila: 53292.86
Buzău: 60633.8
Constanța: 66247.06
Galați: 60469.88
Tulcea: 52741.38
Vrancea: 50112.24

Extractive industry; manufacturing industry; production and supply of electricity and heat, gas, hot water and air conditioning; waste, decontamination activities

Brăila: 67201.34
Buzău: 82470.59
Constanța: 234000
Galați: 97318.18
Tulcea: 80438.6
Vrancea: 61806.23

Wholesale and retail trade; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants

Brăila: 77135.37
Buzău: 64495.36
Constanța: 92195.83
Galați: 27619.25
Tulcea: 67728.4
Vrancea: 64227.07

Information and communications

Brăila: 165125
Buzău: 119714.29
Constanța: 118404.26
Galați: 114833.33
Tulcea: 136363.64
Vrancea: 92000

Real estate transactions

Brăila: 966250
Buzău: 4280000
Constanța: 2164000
Galați: 1181857.14
Tulcea: 3096000
Vrancea: 3509000

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Financial intermediation and insurance

County	Value
Brăila	116888.89
Buzău	131400
Constanța	134920
Galați	114714.29
Tulcea	121000
Vrancea	127285.71

Professional, scientific and technical activities; administrative service activities and support service activities

County	Value
Brăila	85744.68
Buzău	86188.68
Constanța	85500
Galați	94446.43
Tulcea	96766.67
Vrancea	80081.08

Public administration and defence; social insurance in the public system; education; health and social assistance

County	Value
Brăila	100283.69
Buzău	101601.23
Constanța	103297.21
Galați	102065.79
Tulcea	104076.92
Vrancea	93449.66

Entertainment, cultural and recreational activities; repairs of household products and other services

County	Value
Brăila	110937.5
Buzău	79566.67
Constanța	107882.98
Galați	77472.73
Tulcea	64444.44
Vrancea	82640

Source: Data processing – National Institute of Statistics (Tempo Online) 2020

Regarding labor productivity per person employed across the activities of the national economy (NACE rev. 2), form the analysis we have noticed that, during the year 2017, Brăila county registered the highest productivity in the industry of agriculture, forestry and fishing (48,761 lei/capita), much higher than the national average of 18,356 lei/capita. A similarly high level of labor productivity in this sector can also be observed in Tulcea and Constanța counties.

At the level of the extractive industry, the manufacturing industry, the production and supply of energy and heat, gas, hot water and air conditioning, as well as at the level of waste management and decontamination activities, Constanța county registered a very high labor productivity level compared to the other counties in the region (234,000 lei/capita). At the opposite pole are the counties of Brăila and Vrancea.

Regarding the construction industry, labor productivity is similar in all of the six counties and comparable to the national level, of 63,544 lei/capita in 2017.

In wholesale and retail trade activities; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants, labor productivity differs between counties. In this sense, Galați county registered a lower productivity as compared with the national average, but also as compared with other counties in the region. In this regard, the highest level of labor productivity is registered in Constanța county (92,196 lei/capita).

Concerning the IT&C sector, Brăila county had in 2017 the highest level of labor productivity (165,125 lei/capita), at the opposite pole being Vrancea county (92,000 lei/capita). Regarding professional, scientific and technical activities, as well as administrative services and support services, labor productivity does not differ significantly between counties in the South-East Region (The average in the region is 88,156 lei/capita in 2017), but it is much lower than the one registered at the national level, where the indicator averaged, in 2017, at 168,410 lei/capita.

Regarding financial intermediation and insurance activities, as can be seen from the charts displayed above, the counties of Constanța and Buzău have the highest levels of labor productivity in the region, followed by Vrancea, Tulcea, Brăila and Galați, the latter being the county with the lowest labor productivity in the South-East Region. However, comparing labor productivity with the national average in this sector, we observe a very low level of productivity throughout the South-East Region.

Concerning labor productivity in real estate transaction, Buzău, Vrancea and Tulcea counties have a very high level of labor productivity, well above the national average of 2,993,887 lei/person in 2017. This is mainly due to the small number of people employed in this sector, but also due to the high level of gross value added.

To conclude, from the analysis of labor productivity per employed person at the level of the South-East Region, we can indicate that between 2013 and 2017, although gross value added is on an upward trend, the increase in labor productivity can be partly explained by the decline of employment in all counties in the Region.

Investments in the South-East Region

The field of investments is a particularly relevant element regarding the economic development of any region, having a direct effect on the process of modernization of the business environment, transposed into the development of advanced technologies, information transfer, modernization of equipment and

the adoption of new quality standards. Thus, this section envisages this development, starting with an analysis of **foreign direct investments[15].**

Figure no. 79. Evolution of FDI in the period 2009-2018 at the national level
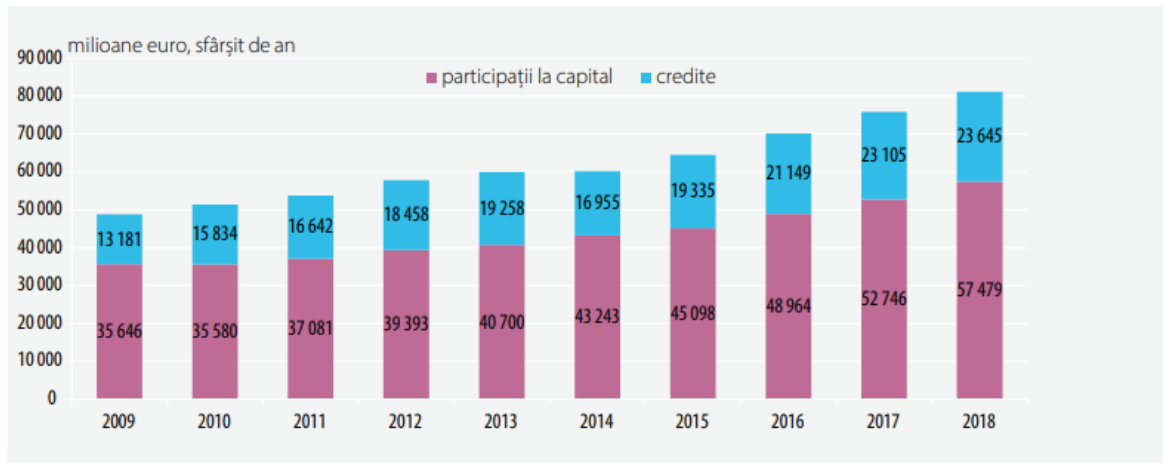
Source: Data processing – National Bank of Romania 2020

It can be seen from the graph above that the evolution of foreign direct investment at national level has an upward trend in the period 2014 - 2018. Compared to 2014, when FDI amounted to 43,343 million Euros from capital participants and 16,955 million Euros from loans, in 2018 they reach 57,479 million euros from capital participants and 23,645 million euros from loans. Thus, according to the NBR[16] data, the FDI balance at December 31, 2018 registered the level of 81,124 million euros. It can be stated, on the basis of the data presented above, that 71% of the final balance of FDI is made up of the equity of non-resident FDI enterprises, while the net credit received by them from foreign direct investors, including from the group , the value of 23,645 million euros, representing 29.15 percent of the final balance of FDI.

Concerning the distribution of FDI balance across the main economic activities, the table below shows that the largest amount of FDI is recorded at the industry level (EUR 33,311 million), followed by

---

[15] Foreign Direct Investments (FDI) is an important descriptor in explaining the process of market globalization by which at least a number of factors of endogenous economic growth are determined, as well as explaining the financial flows between countries. Foreign Direct Investments are expenses incurred for the creation or purchase of economic agents, the renewal and enlargement of existing ones, with the role of obtaining future income for foreign investors. These are long-term international connections between a resident and a non-resident structure, requiring the entrepreneur to achieve significant managerial influence in the company in which he or she has invested. The components of Foreign Direct Investments are equity participations that belong to non-resident investors that hold at least 10% of the subscribed share capital of resident enterprises, the profit reinvested by them, as well as debt instruments (i.e. loans) between investors or the group from which they are part of and the companies in which they have invested.

[16] NBR (2020): Foreign direct investments in Romania in 2019.

investments in constructions as well as real estate transactions (13,651 million EUR). Lastly, the commerce industry reported an investment of 12,865 million EUR in forms of FDI.

Table no.12. The distribution on the main economic activities of the FDI balance on December 31, 2018

	Value (Million EUR)	% of total FDI (%)
Industry	33 311	41,1%
Professional, scientific, technical and administrative activities and support services	3 991	4,9%
Agriculture, forestry and fishing	2 406	3,0%
Commerce	12 865	15,8%
Construction and real estate transactions	13 651	16,8%
Hotels and restaurants	528	0,6%
Financial intermediation and insurance	9 308	11,5%
Information and communication technology	3 321	4,1%
Transport	1 281	1,6%
Other activities	462	0,6%

Regarding the distribution of the FDI balance by development regions, the data provided by the National Bank of Romania confirms that the highest rate of foreign direct investment is found in the Bucharest - Ilfov Region (60.7%), other development regions that attracted a significant volume of FDI being the Central Region (9.0%), the Western Region (8.6%). At the level of the South-East Region, the total foreign direct investments represented, in 2018, 4.2% (3,447 million EUR).

Table no. 12. Distribution of FDI balance by development regions on December 31, 2018

	Value (million euro)	Percentage in total FDI (%)
București – Ilfov Region	49 250	60,7
Center Region	7 311	9,0
West Region	6 948	8,6
South – Muntenia Region	5 136	6,3
North – West Region	4 610	5,7
South – East Region	**3 447**	**4,2**
South – West Oltenia Region	2 478	3,1
North – East Region	1 924	2,4

Source: Data processing – National Bank of Romania 2020

Figure no. 79. Distribution of FDI balance by regions as of December 31, 2018 (%)
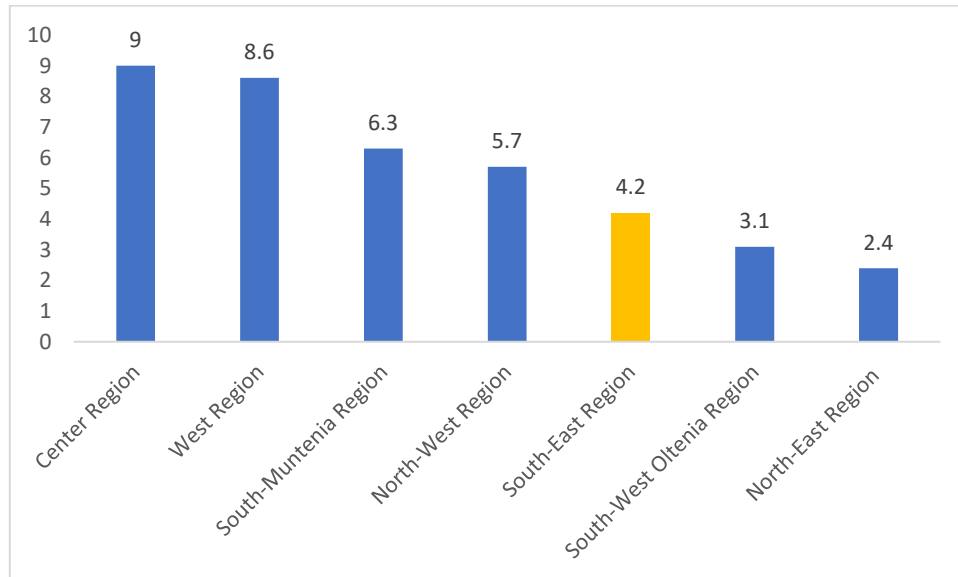
Source: Data processing – National Bank of Romania 2020

At the county level, Constanța has the highest potential for economic development as a result of foreign direct investments (1,852 million Euros), respectively 54% of total foreign direct investments made in 2018 in the South-East Region.

The county with the lowest degree of attractiveness in terms of foreign direct investment is Vrancea County, which in 2018 attracted 121 million euros in foreign direct investment.

Figure no. 80. Distribution of FDI balance by counties on December 31, 2018 (million EUR)
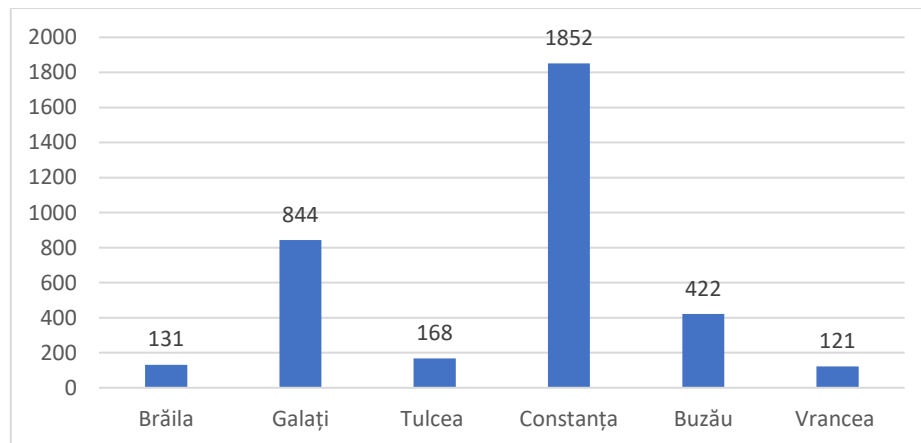
Source: Data processing – National Bank of Romania 2020

The evolution regarding gross investments realized by active local units, at regional and national level, in the period 2014-2018 is presented in the next paragraphs. At national (total) level, gross investments showed an exponential increase in the period 2014-2018, from approximately 129,105 million lei, at 161,314 million lei.

At regional level, the highest level of gross investments is observed in the Bucharest-Ilfov Region, followed by the Center Region, while the least number of investments were present in the South-West Oltenia Region.

Regarding the evolution of investments in the South-East Region, a downward trend can be observed in the period 2014 - 2016, while a steady increase can be seen from the year 2016 and forward.

An analysis of the evolution of gross investments by branches of activity, at national and regional level, reveals that the share of gross investments in constructions increased from 5% in 2010 to 6% in 2018. The largest investments took place in the Bucharest-Ilfov Region and the North-East Region, throughout the analyzed period.

Figure no. 82. Evolution of the share of gross investments in constructions as % of total gross investments at the level of regions in the period 2014-2018
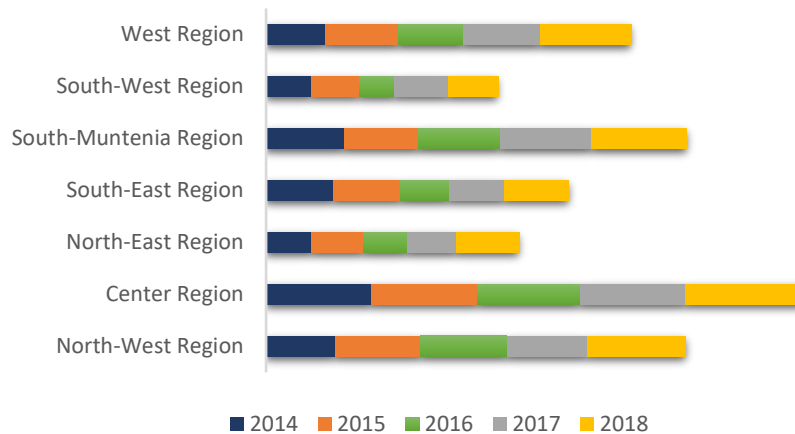
Source: Data processing – National Institute of Statistics 2020

On the other hand, the lowest share of investments in the construction sector is found in the South-West Oltenia Region, with an average of 4% of total gross investments. Unlike the trend of investments in at the level of the industry, the trend in services is an increasing one. In the South-East Region, the share of investments in services increased from 24% in 2010 to 31% in 2018.

Comparative advantages of the South-East Region

The situation of imports and exports from the South-East Region will be presented below. A thorough analysis of these indicators is needed to measure the comparative advantages of the region. The evolution of the trade balance will also be analyzed. In the analysis of the above-mentioned indicators, data published by the National Institute of Statistics was used.

Goods exported and imported are classified according to the Combined Nomenclature (N.C.), which is the basis of the Community customs tariff. Thus, the product groups according to the combined nomenclature are shown in the table below

Table no. 14. Product groups according to the combined nomenclature

I.	Live animals and animal products
II.	Vegetable products
III.	Animal or vegetable fats and oils
IV.	Food, beverages and tobacco
V.	Mineral products
VI.	Chemical products
VII.	Plastic materials, rubber and articles thereof
VIII.	Raw hides, skins and furskins articles thereof
IX.	Wooden products, excluding furniture
X.	Paper and articles thereof
XI.	Textiles and articles thereof
XII.	Footwear, hats, umbrellas and similar articles
XIII.	Articles of stone, plaster, ceramics, glass and other similar materials
XIV.	Common metals and articles thereof
XV.	Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus
XVI.	Means and materials for transportation
XVII.	Instruments and optical machinery
XVIII.	Goods and diverse products
XIX.	Other products not elsewhere specified or included

Source: Data processing – National Institute of Statistics 2020

According to the data, the total exports in the counties of the South-East Region are as follows: Constanța registered in June 2020 a value of 97,554 million EUR in exports, registering a decrease in the value of exports compared to the same month in previous years (2014 - 2019). The county with the lowest value of exports is Tulcea County, which registered 8,164 million EUR in exports. At the level of the region, it can be seen that the value of exports amounted to 5,085,746 million EUR.

Figure no. 83. Exports (FOB) by county – Monthly Data
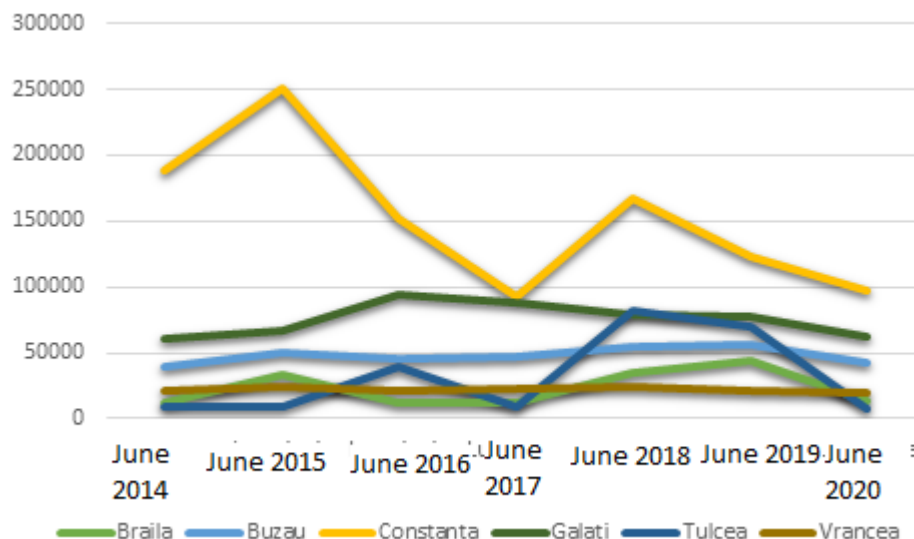
Source: Data processing – National Institute of Statistics 2020

Table no. 15. Exports (FOB) by county – Monthly Data

Counties	June 2014	June 2015	June 2016	June 2017	June 2018	June 2019	June 2020
Brăila	12532	33811	12393	12245	**34640**	43768	13706
Buzău	39910	50222	45729	47070	**54846**	55408	42773
Constanța	188416	250335	152520	93149	**166641**	123655	97554
Galați	61193	66181	93949	87924	**78237**	76941	61555
Tulcea	8946	8629	39487	9260	**81774**	70280	8164
Vrancea	21094	24295	21431	23296	**23720**	20659	20104

Source: Data processing – National Institute of Statistics 2020

Moreover, taking into account the product groups according to the combined nomenclature, it can be seen that at the level of the region the groups of common metal products, mineral products, vegetables, textiles and food products record the highest value of exports, namely EUR 139,114 million. The groups with the lowest value of exports are product groups such as wood products, excluding furniture, footwear, hats, umbrellas and similar items.

Figure no. 84. Imports (FOB) by county – monthly data
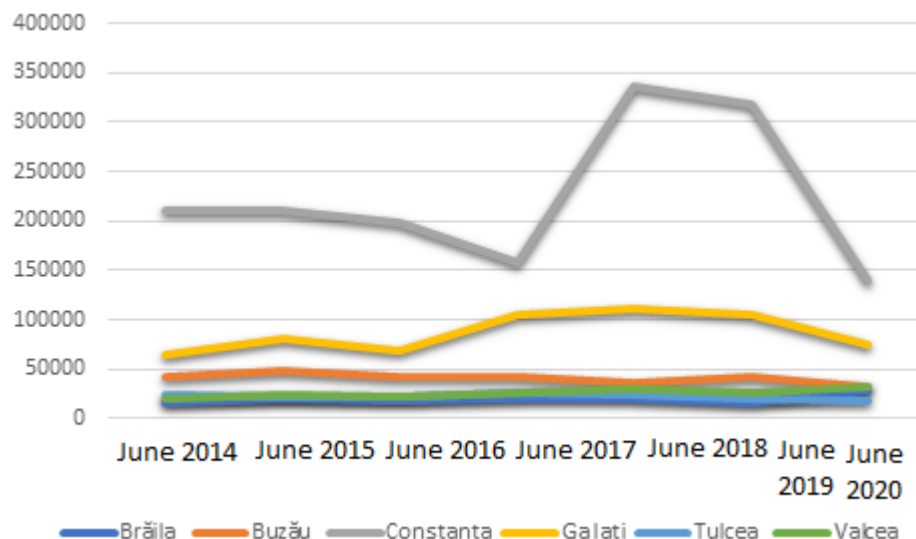
Source: Data processing – National Institute of Statistics 2020

Table no. 136. Imports (FOB) by county – monthly data

Counties	June 2014	June 2015	June 2016	June 2017	June 2018	June 2019	June 2020
România	4796819	5490014	5637618	6433891	7185776	6692083	6160228
South East Region	379093	404935	371911	377958	560196	528255	326650
Brăila	16913	20220	18016	20746	20308	16243	28272
Buzău	42585	49090	42479	42473	35733	41567	32236
Constanța	211263	210962	198614	157129	336700	318506	139911
Galați	64459	80095	68333	105028	111358	106145	74961
Tulcea	24398	21137	22610	26136	25084	20114	18330
Vrancea	19475	23431	21859	26446	31013	25680	32940

Source: Data processing – National Institute of Statistics 2020

According to the data presented above, the total imports in the counties of the South-East Region are as follows: Constanța registered in June 2020 a value of 139,911 million euros in imports, registering a decrease in the value of imports compared to the same month in previous years (2014 - 2019). The county with the lowest value of imports is Tulcea County, which recorded 18,330 million euros in imports. At the level of the region, it can be seen that the value of imports amounted to 6,160,228 million euros.

It is also necessary to present the evolution of the trade balance in understanding the situation of exports and imports. The balance of the FOB / FOB trade balance is calculated on the basis of the value of the FOB export and the FOB import, as the difference between them.

The evolution of the indicator can be seen in the graph below.

Figure no. 81. The evolution of the CB FOB / FOB balance at national level during 2014-2019

| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |

-6056
-8361
-9972
-12960
-15117
-17282
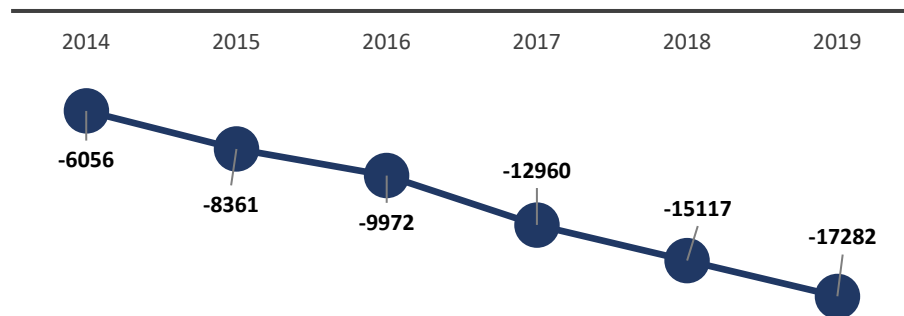
Source: Data processing – National Institute of Statistics 2020

The chart above reveals that Romania's trade balance is deficient, the lowest values of the balance being recorded in 2019.

Industrial agglomerations

Industrial agglomerations are geographical concentrations of companies and institutions operating in a certain field. They include, in addition to a number of related institutions, other entities (customers, specialist suppliers, service providers, companies in related industries and associated institutions), which have an important role to play in terms of competition. These competitive agglomerations are a new way of organizing a value circuit or a new spatial form of organization, significantly different from the traditional integration of companies in the market.

Industrial activities are mainly concentrated in urban centers, especially large ones, and are almost non-existent in rural areas. The first 5 sub-sectors of industrial production in the South-East Region show that the predominant industries are traditional (food industry 20.91% and furniture industry 6.86%) and heavy mechanics (metal construction and metal products industry), representing 12.44% of the total enterprises in the manufacturing industry. The shipbuilding industry is specific to the analyzed

region, being an incipient form cluster, advantaged by the positioning of the shipyards from Brăila, Galați, Mangalia, Tulcea, Constanța.

Industrial activity is concentrated in all counties in the region. This activity concentrates in Constanța (30.54% of the active units in the field), respectively 18.49% in Buzău, 17.89% in Galați, 10.99% in Brăila, 15.44% in Vrancea and 6.6% in Tulcea.

Regarding the **Vrancea** county, the manufacture of clothing articles stands out, with 18.11% of the total enterprises operating in this field. Also noteworthy is the wood processing industry, the manufacture of wood and cork products, except for furniture, which represents 14% of all companies in the processing industry in the county. Together, the two industries represent 32.11% of the manufacturing industry in Vrancea County.

At the level of Vrancea county, the need for an industrial park was identified, and the authorities brought this discussion several times on the public and political agenda. The lack of consistency in the application of the necessary measures to transform the industrial area into one that can be considered an industrial park is to the detriment of reaching the socio-economic development potential of the county and the region.

Regarding **Tulcea** County, the food industry is by far the most developed industry in the county, representing 21.76% of all companies in the manufacturing industry. In Tulcea, other representative industrial sectors are the shipbuilding and repair industry, the wood processing industry and the light industry.

Galați County is the 4th largest industrial center in the country. The mechanical sector is the most developed here, the enterprises being concentrated on the metal construction and metal products industry, the manufacture of means of shipping, machinery and equipment.

In Galați there is the Galati Industrial Park, which has many competitive advantages, especially related to connectivity with other national and international areas. Employees working in industry and construction represent an important percentage of the total number of employees in the county, so the field is one that needs special attention, representing an important factor for socio-economic development in the area. The industry is undergoing a process of technologicalization that involves specialization, specialization and continuous training of staff.

In **Constanța** County, industrial activities are oriented towards the mechanical and chemical sector. The top sector is the production of water vessels and means of transport, concentrating over 10% of the companies in the county. Other important sectors are the metal industry, rubber and plastics processing and activities in the production of machinery and equipment. The food industry is the sector that accounts for about 21% of all companies in the field of manufacturing.

At the level of Constanța county there are several industrial poles, and the rapid dynamics of this field transform the industrial reality with a speed that is difficult to follow. Thus, if for Mangalia Industrial Park the direction of development was offered by the local context (location, resources, local opportunities, etc.), for Constanța the process of harmonization of development is still in its early stages. The beginning of 2020 was marked by the start of works for the construction of a mixed center, in which industrial and service activities will take place. The accessibility of these new buildings is essential to ensure the integration of all into the labor market, and the sustainability of production processes and the efficiency of the services provided must also be integrated from this stage. In order to successfully integrate the workforce, it is also necessary to specialize it.

In **Buzau** county, traditional industrial activities (food industry and furniture production) include a large number of companies. The food industry represents, at the county level, 20% of the total companies in the manufacturing industry.

Food production is the predominant sector in Brăila County, occupying 22% of the companies in the field. The production of clothing, the metal construction industry, the production of electricity, furniture and furniture items are other areas developed in this county.

Figure no. 82. Evolution of the share of active local units in the extractive and processing industry as a share of total active local units of the South-East Region in the period 2014-2018
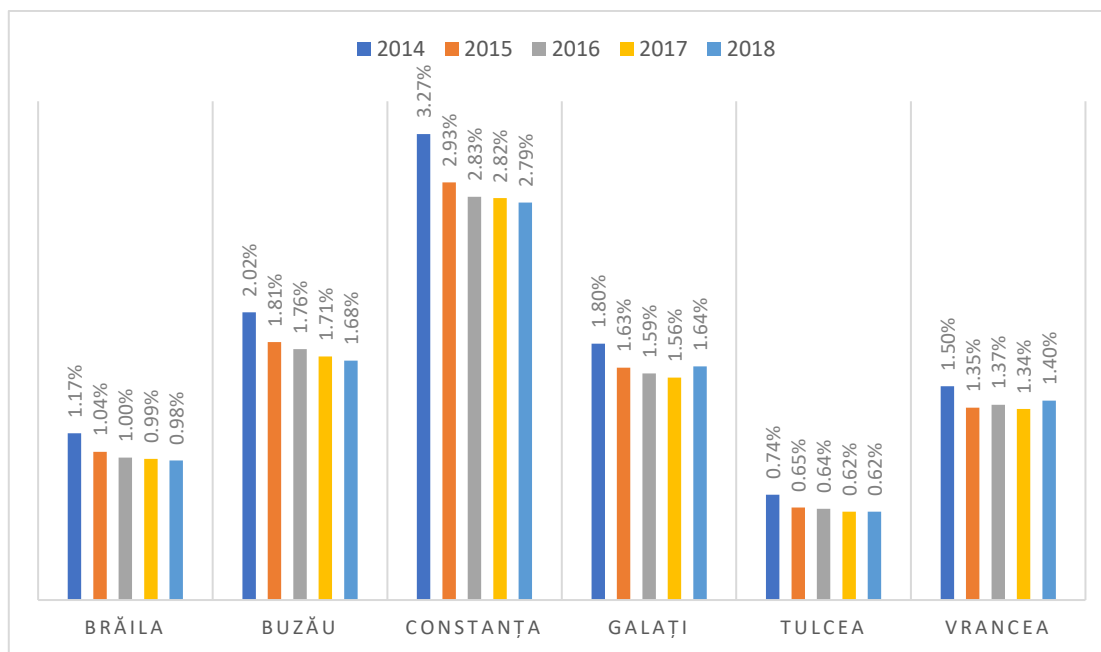
Source: Data processing – National Institute of Statistics 2020

Revealed Comparative Advantage - RCA

In order to highlight the comparative advantages of a country / region, specialists recommend the use of the Revealed Comparative Advantage (RCA), proposed by Balassa (1965), whose calculation methodology has undergone many changes, depending on the objectives pursued and due to the fact that the comparative advantages of a region / country depend on a very large number of internal and external factors.

In this study we used the Comparative Advantage Index (CAI) to determine the most important groups of products in foreign trade of the region and component counties. This index is used in the international economy to determine the competitive advantage or disadvantage of a region by product and service category.

The Revealed Comparative Advantage Index (RCA) was calculated by analyzing the volume of exports (FOB) by counties and sections of the Combined Nomenclature (CN) for the period 2017-2019, compared to the volume of total exports by chapters of the Combined Nomenclature (CN) from Romania. The following formula was utilized:

$$RCA = \ln(x_{ij}/X_i)/(x_{aj}/X_a), \text{ where:}$$

x_{ij} = export volume of a product from the South-East Region

X_i = volume of total exports to the South-East Region

x_{aj} = the volume of export of a product to Romania

X_a = volume of total exports to Romania

According to this index, a region has a comparative advantage for a certain product category if the RCA is positive, revealing that exports from the region for that product category are above expectations relative to total exports from the region (Identifying Revealed Comparative Advantage in year EU Regional Context, 2016). There are specialists and studies that claim that a RCA> 1 demonstrates a relevant comparative advantage.

According to the data analyzed by the World Bank, Romania registers worldwide comparative advantages for the following product groups presented in the table below. Analyzing the evolution over time of the indicator, we observe relatively constant values for products such as: vegetables, plastics, leather, footwear, means of transport, agricultural products, but also a drastic decrease in Romania's comparative advantage worldwide for minerals and chemicals. Romania's biggest comparative advantage worldwide refers to the category of footwear products. Thus, we can see that the comparative advantage index for footwear, although decreasing, is 3.12 in 2017.

Table no. 14. Revealed Comparative Advantage – RCA of Romania as compared to worldwide values, 2013 -2017

Category of products	2013	2014	2015	2016	2017
Vegetable products	1.50	1.79	1.61	1.63	1.43
Plastics and rubber	1.36	1.28	1.26	1.29	1.29
Leather	1.14	1.19	1.12	1.08	1.14
Wood	1.99	1.75	1.69	1.47	1.38
Textiles and clothing	2.45	2.33	2.18	2.12	1.98
Footwear	4.79	4.30	3.58	3.29	3.12
Metals	1.43	1.24	1.19	1.12	1.15
Machines and electrical products	1.09	1.10	1.04	1.08	1.08
Means of transport	1.65	1.60	1.52	1.56	1.77
Agricultural products	1.46	1.33	1.24	0.94	0.96
Manufactured products	1.23	1.19	1.13	1.13	1.16

Source: Data processing – World Bank, WITS 2020

Figure no. 83. RCA of Romania at worldwide level, vegetable products, 1989 – 2017
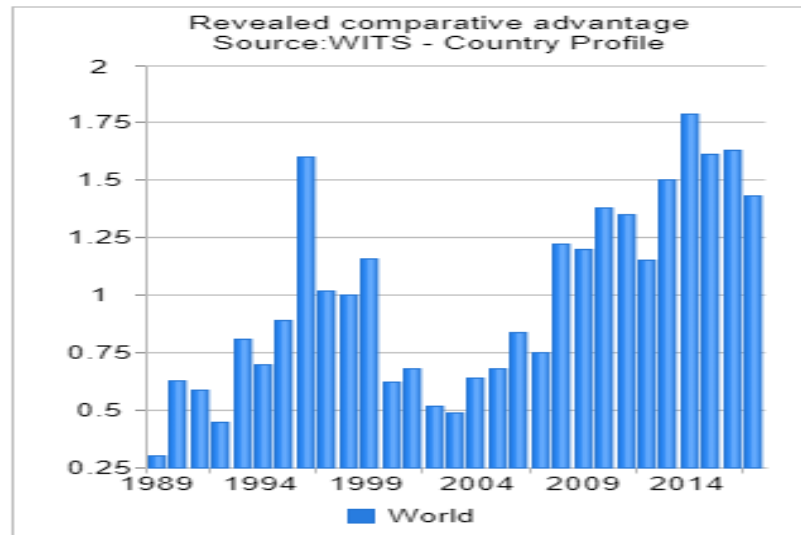
Source: World Bank, WITS 2020

Figure no. 88. RCA of Romania at worldwide level, minerals, 1989 – 2017
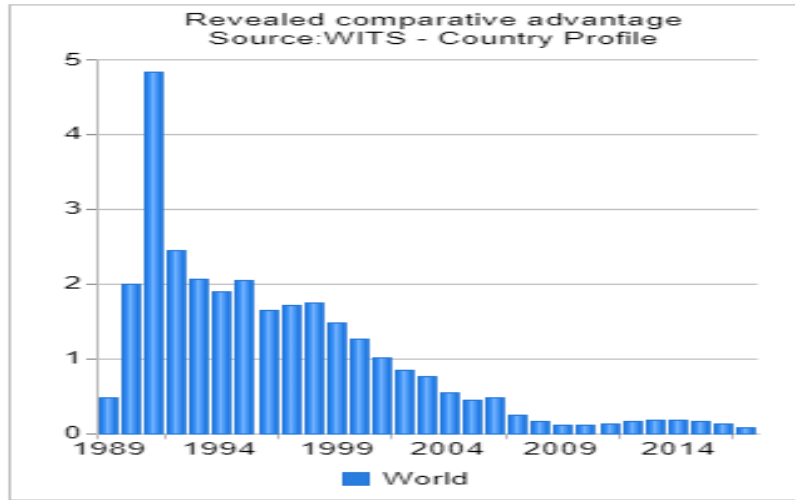
Source: World Bank, WITS 2020

Figure no. 89. RCA of Romania at worldwide level, chemical products, 1989 – 2017
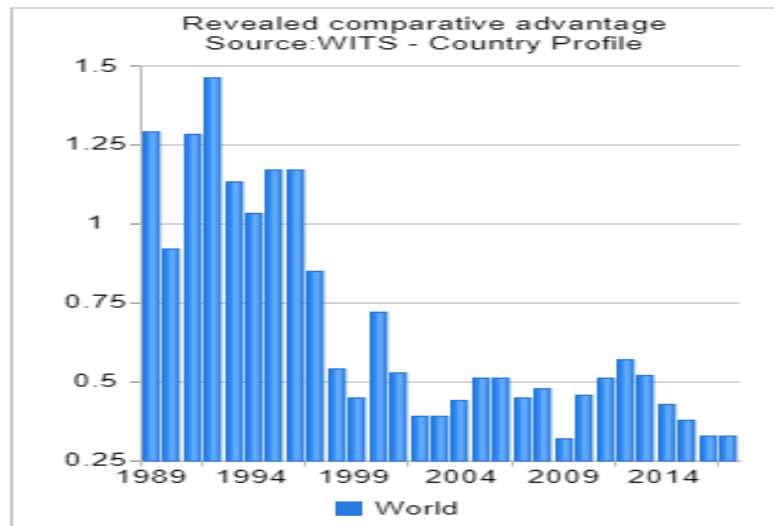
Source: World Bank, WITS 2020

Figure no. 9084. RCA of Romania at worldwide level, rubber and plastics, 1989 – 2017
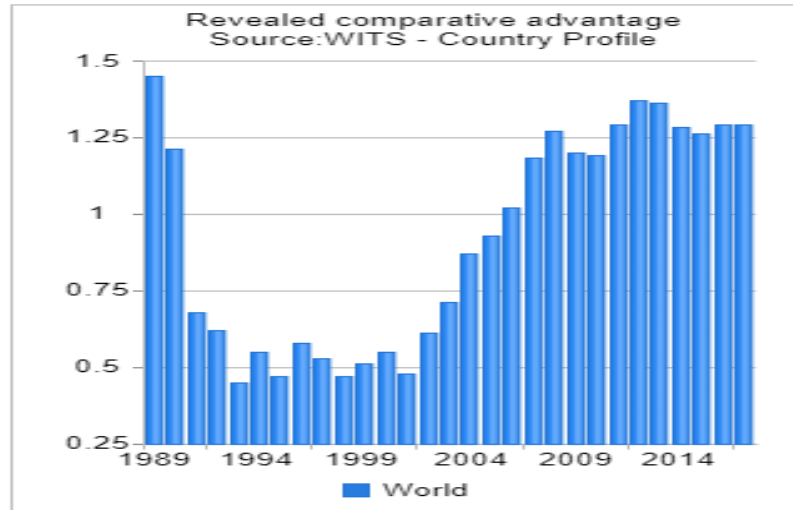
Source: World Bank, WITS 2020

Figure no. 91. RCA of Romania at worldwide level, textiles and clothing, 1989 – 2017

Source: World Bank, WITS 2020

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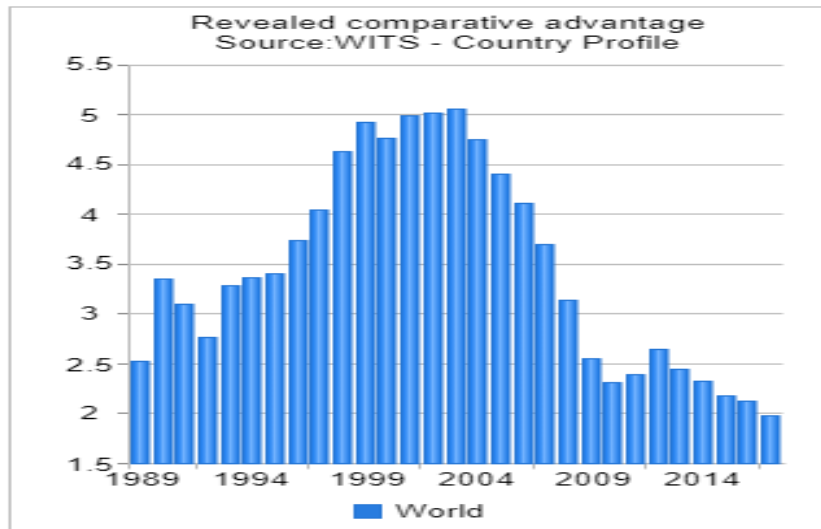
Figure no. 852. RCA of Romania at worldwide level, means of transport, 1989 – 2017

Source: World Bank, WITS 2020

At the international level, the Comparative Advantage Index is also calculated by the United Nations, which performs a detailed analysis of RCA, by product category. According to the UN, in 2019, the largest comparative advantage worldwide that Romania had was in the category of measuring instruments and meters (15,15). Romania also records high RCA values for the products: corn (9.85), electricity distribution equipment (7.42), tobacco (7.31), wheat (7.14), bearings (6.87), barley (5.90), live animals (5.06), wood (4.99), tires (4.90), vehicle accessories (4.18), rubber elements (4.14), seeds and oilseeds (3.83), electrical circuit equipment (3.71), leather products (3.68), furniture (3.52), etc.

Compared to Romania, neighboring countries or similar in terms of economic and social development have similar comparative advantages. We can specify that Bulgaria registers an RCA> 10 for four product categories: ores, lead, wheat and copper. Greece has the largest comparative advantages worldwide for cotton, stone, sand and gravel, leather and fur; Hungary has the highest RCA for broadcasting receivers (15.24); Ukraine has many advantages compared to an RCA> 20 for vegetable products, barley, corn, iron and steel or firewood and charcoal; Serbia has RCA> 10 for leather products, corn, fruit and electricity distribution equipment.

The identification of areas with competitive potential also comes from the analysis of the evolution of the relative performance of exports by product categories. In table no. 18 we filtered the significant products for the country's economy according to three categories, according to the SITC classification rev.4, level 3.

We have defined "significant" exports as those for which RCA> 1 both in 2009 and in 2019. We notice that there are 54 such product groups in which Romania is internationally competitive, especially in the

field of agricultural products, plastics, means of transport for persons, ferrous and non-ferrous metals. It is interesting to note the strong increase in RCA in the last 10 years for measuring instruments and meters from only 1.47 in 2009 to 15.15 in 2019, these being products whose production requires high level knowledge and skills.

We defined "emerging" exports those that in 2009 had an RCA <1 but in 2019 an RCA> 1, highlighting a development of the respective industries and an increased competitiveness at international level. 11 such product groups were identified, mostly iron, steel and aluminum products, measuring, analysis and control equipment, plastic products and insecticides.

We defined "declining" exports, exports for which in 2009 RCA> 1, and in 2019, RCA <1. We notice that in relation to international trade, industries such as textiles, leather, shipbuilding, etc. is in decline, Romania's exports relative to world exports being declining.

Table no. 15. The evolution of the significance of exports between 2009 and 2019, according to RCA

Exports	SITC rev.4	RCA 2009	RCA 2019
Significant	[041] Wheat (including spelt) and meslin, unmilled	3.981915283	7.147901612
Significant	[122] Tobacco, manufactured	5.913652709	7.316922654
Significant	[248] Wood simply worked, and railway sleepers of wood	6.292648153	2.955165928
Significant	[282] Ferrous waste, scrape; remelting ingots, iron, steel	6.735433988	2.29827659
Significant	[288] Non-ferrous base metal waste and scrap, n.e.s.	2.610544563	1.302844501
Significant	[351] Electric current	1.792834999	1.208399478
Significant	[554] Soaps, cleansing and polishing preparations	1.268715197	1.389675085
Significant	[621] Materials of rubber (pastes, plates, sheets, etc.)	3.368735747	4.14265554
Significant	[629] Articles of rubber, n.e.s.	2.453672373	3.694800379
Significant	[634] Veneers, plywood, and other wood, worked, n.e.s.	4.344352423	4.995497436
Significant	[635] Wood manufacture, n.e.s.	3.202824057	2.68037324
Significant	[651] Textile yarn	2.496023424	2.049588276
Significant	[656] Tulles, trimmings, lace, ribbons & other small wares	2.967728119	1.938398835
Significant	[658] Made-up articles, of textile materials, n.e.s.	1.770304103	1.776261997
Significant	[666] Pottery	2.184453893	1.680161017
Significant	[678] Wire of iron or steel	1.850656285	1.109938642
Significant	[679] Tubes, pipes & hollow profiles, fittings, iron, steel	1.973633475	2.614916636
Significant	[684] Aluminium	1.674668337	1.76079802
Significant	[685] Lead	1.526844419	1.131974057
Significant	[699] Manufactures of base metal, n.e.s.	1.291321983	1.77664717
Significant	[746] Ball or roller bearings	7.332525832	6.879137007
Significant	[748] Transmis. shafts	1.368511936	1.290418681
Significant	[772] Apparatus for electrical circuits; board, panels	1.721745084	3.714041524
Significant	[773] Equipment for distributing electricity, n.e.s.	9.411620751	7.422427792
Significant	[781] Motor vehicles for the transport of persons	1.650303743	1.748934487
Significant	[784] Parts & accessories of vehicles of 722, 781, 782, 783	2.698490231	4.181687389
Significant	[791] Railway vehicles & associated equipment	4.802512177	1.637645905
Significant	[811] Prefabricated buildings	2.541743078	1.910815957

Exports	SITC rev.4	RCA 2009	RCA 2019
Significant	[812] Sanitary, plumbing, heating fixtures, fittings, n.e.s.	2.454600913	1.42532664
Significant	[851] Footwear	5.096414506	2.156260363
Significant	[001] Live animals other than animals of division 03	3.9141521	5.064119768
Significant	[043] Barley, unmilled	5.707710755	5.905541642
Significant	[044] Maize (not including sweet corn), unmilled	5.315653884	9.850569165
Significant	[222] Oil seeds and oleaginous fruits (excluding flour)	3.503021429	3.838926526
Significant	[246] Wood in chips or particles and wood waste	1.724289366	1.208265049
Significant	[261] Silk	2.772937077	3.192213219
Significant	[421] Fixed vegetable fats & oils, crude, refined, fractio.	1.306003338	1.601349345
Significant	[611] Leather	1.405384699	1.141609798
Significant	[612] Manufactures of leather, n.e.s.; saddlery & harness	2.740204252	3.680626992
Significant	[625] Rubber tyres, tyre treads or flaps & inner tubes	4.441037886	4.902639245
Significant	[654] Other textile fabrics, woven	1.252460535	1.561484564
Significant	[673] Flat-rolled prod., iron, non-alloy steel, not coated	3.336560899	2.628660329
Significant	[675] Flat-rolled products of alloy steel	1.086648774	1.135440474
Significant	[693] Wire products (excluding electrical) and fencing grills	3.836904345	3.341045621
Significant	[716] Rotating electric plant & parts thereof, n.e.s.	1.186511316	1.570463881
Significant	[735] Parts, n.e.s., & accessories for machines of 731, 733	2.058517891	1.061648623
Significant	[743] Pumps (excluding liquid), gas compressors & fans; centr.	1.665238193	2.548870028
Significant	[775] Household type equipment, electrical or not, n.e.s.	1.847313382	2.662266995
Significant	[778] Electrical machinery & apparatus, n.e.s.	1.047247407	1.512685993
Significant	[785] Motorcycles & cycles	1.132630337	1.299780986
Significant	[821] Furniture & parts	3.785264248	3.524884602
Significant	[841] Men's clothing of textile fabrics, not knitted	5.000297306	2.56916252
Significant	[842] Women's clothing, of textile fabrics	4.710482191	2.065939776
Significant	[873] Meters & counters, n.e.s.	1.477102847	15.15186041
Emergent	[672] Ingots, primary forms, of iron or steel; semi-finis.	0.414551868	1.418706826
Emergent	[691] Structures & parts, n.e.s., of iron, steel, aluminium	0.898780876	1.984677651
Emergent	[692] Metal containers for storage or transport	0.785517543	1.113814174
Emergent	[744] Mechanical handling equipment, & parts, n.e.s.	0.548417961	1.20974155
Emergent	[017] Meat, edible meat offal, prepared, preserved, n.e.s.	0.854069038	1.899425708
Emergent	[073] Chocolate, food preparations with cocoa, n.e.s.	0.455984955	1.048787482
Emergent	[581] Tubes, pipes and hoses of plastics	0.743630898	1.486014515
Emergent	[591] Insectides & similar products, for retail sale	0.197706708	1.010541102
Emergent	[742] Pumps for liquids	0.64946101	3.058356485
Emergent	[874] Measuring, analysing & controlling apparatus, n.e.s.	0.834291003	1.645536737
Emergent	[893] Articles, n.e.s., of plastics	0.636462748	1.302377897
In decline	[334] Petroleum oils or bituminous minerals > 70 % oil	1.230246852	0.80641201
In decline	[711] Vapour generating boilers, auxiliary plant; parts	1.223827859	0.968211834
In decline	[712] Steam turbines & other vapour turbin., parts, n.e.s.	1.606504945	0.888328823
In decline	[718] Other power generating machinery & parts, n.e.s.	2.276683416	0.344047883
In decline	[723] Civil engineering & contractors' plant & equipment	1.021703187	0.383249646
In decline	[764] Telecommunication equipment, n.e.s.; & parts, n.e.s.	1.50244935	0.412535818
In decline	[782] Motor vehic. for transport of goods, special purpo.	1.127071505	0.042742598
In decline	[844] Women's clothing, of textile, knitted or crocheted	1.936959875	0.751936148

Exports	SITC rev.4	RCA 2009	RCA 2019
In decline	[846] Clothing accessories, of textile fabrics	1.883025796	0.831462161
In decline	[211] Hides and skins (except furskins), raw	1.086334534	0.604272889
In decline	[268] Wool and other animal hair (incl. wool tops)	1.093494744	0.273977461
In decline	[344] Petroleum gases, other gaseous hydrocarbons, n.e.s.	3.223503246	0.241547079
In decline	[523] Metallic salts & peroxysalts, of inorganic acids	1.621086046	0.3431129
In decline	[562] Fertilizers (other than those of group 272)	2.439025274	0.602590538
In decline	[574] Polyethers, epoxide resins; polycarbonat., polyesters	1.233419521	0.687750601
In decline	[696] Cutlery	1.186126789	0.641373764
In decline	[761] Television receivers, whether or not combined	1.731272247	0.481636299
In decline	[793] Ships, boats & floating structures	2.90770864	0.968926218
In decline	[843] Men's or boy's clothing, of textile, knitted, croche.	1.306021076	0.642499863
In decline	[845] Articles of apparel, of textile fabrics, n.e.s.	1.485724545	0.619392265

Source: data processing - UN, UN Comtrade

Regarding the South-East Region, the comparative advantage of the region was analyzed using the Revealed Comparative Advantage Index (RCA), calculated by analyzing the volume of exports (FOB) by counties and sections of the Combined Nomenclature (CN) for the period 2017 - 2019, compared to the volume of total exports by chapters of the Combined Nomenclature (CN) in Romania. In the period 2017–2019, the region has comparative advantages with RCA> 1 for the sections: live animals and animal products, animal or vegetable fats and oils, mineral products, base metals and articles thereof. Even in those areas where product development does not involve much innovative technology or the need for high-level skills, the comparative advantages of the region are low.

Table no. 169. Revealed Competitive Advantage of the South-East Region, 2017 – 2019

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
I. Live animals and animal products	1.32	1.29	1.48
II. Vegetable products	0.80	0.89	0.93
III. Animal or vegetable fats and oils	2.03	2.09	2.04
IV. Food, beverages and tobacco	-0.20	0.05	-0.04
V. Mineral products	1.48	1.55	1.60
VI. Chemical products	-0.97	-0.64	-0.94
VII. Plastic materials, rubber and articles thereof	-0.58	-0.62	-0.81
VIII. Raw hides, skins articles thereof	-2.55	-2.80	-2.63
IX. Wooden products, excluding furniture	-0.69	-0.85	-0.92
X. Paper and articles thereof	-1.06	-1.26	-1.33
XI. Textiles and articles thereof	0.54	0.53	0.60
XII. Footwear, hats, umbrellas and similar articles	-1.44	-1.61	-1.56
XIII. Articles of stone, plaster, ceramics, glass and other similar materials	0.24	0.40	0.55
XV. Common metals and articles thereof	0.90	0.98	1.07

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
XVI. Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus	-2.40	-2.39	-2.25
XVII. Means and materials for transportation	-0.08	-0.44	-0.72
XVIII. Instruments and optical machinery	-4.00	-4.27	-4.09
XX. Goods and diverse products	-1.98	-2.19	-2.14
XXII. Other products not elsewhere specified or included	-0.64	-0.89	-0.88

Source: data processing – National Institute of Statistics, 2020

The analysis of exports by sections of the combined nomenclature reveals comparative advantages of Brăila County at national level for the sections: Live animals and animal products, Textiles and textile articles, Footwear, hats, umbrellas and similar articles. Also, there is an increase in the comparative advantage in the last 3 years for plant products, from RCA = -0.2 in 2017, to RCA = 0.99 in 2019, Brăila County being a county with very high agricultural potential.

Table no. 20. Comparative Advantage Index, Brăila, 2017 – 2019

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
I. Live animals and animal products	2.36	2.10	2.40
II. Vegetable products	-0.22	0.19	0.99
III. Animal or vegetable fats and oils	-3.05	NA	NA
IV. Food, beverages and tobacco	-1.05	-2.12	-0.98
V. Mineral products	-3.63	-3.79	-3.17
VI. Chemical products	-2.75	-4.05	-3.29
VII. Plastic materials, rubber and articles thereof	-0.85	-1.39	-1.23
VIII. Raw hides, skins articles thereof	-2.33	-3.38	-3.70
IX. Wooden products, excluding furniture	-2.07	-3.16	-2.67
X. Paper and articles thereof	-0.73	-1.92	-1.65
XI. Textiles and articles thereof	1.62	1.09	1.39
XII. Footwear, hats, umbrellas and similar articles	0.92	0.60	1.14
XIII. Articles of stone, plaster, ceramics, glass and other similar materials	-2.17	-4.15	-3.36
XV. Common metals and articles thereof	-0.75	-0.96	-0.57
XVI. Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus	-2.03	-1.62	-1.95
XVII. Means and materials for transportation	0.46	0.97	0.46
XVIII. Instruments and optical machinery	-3.83	-6.08	-4.67

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
XX. Goods and diverse products	-2.45	-5.09	-2.20
XXII. Other products not elsewhere specified or included	-1.68	-2.13	-1.56

Source: data processing – National Institute of Statistics, 2020

In Buzau county, the comparative advantage index is higher than 1 for the sections: Live animals and animal products, Animal or vegetable fats and oils, Food, beverages and tobacco, Textiles and textile articles, Articles of stone, plaster, cement, ceramics, glass and other similar materials, Base metals and articles thereof.

Table no. 21. Comparative Advantage Index, Buzău, 2017 – 2019

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
I. Live animals and animal products	1.23	1.51	1.63
II. Vegetable products	0.01	-0.62	-1.04
III. Animal or vegetable fats and oils	3.51	3.56	3.43
IV. Food, beverages and tobacco	1.12	1.45	1.32
V. Mineral products	-4.38	-6.27	-5.45
VI. Chemical products	-0.93	-0.96	-0.90
VII. Plastic materials, rubber and articles thereof	-0.18	0.00	-0.10
VIII. Raw hides, skins articles thereof	-3.14	-3.02	-6.30
IX. Wooden products, excluding furniture	-0.17	-0.60	-0.67
X. Paper and articles thereof	-3.06	-4.29	-4.58
XI. Textiles and articles thereof	1.31	1.41	1.48
XII. Footwear, hats, umbrellas and similar articles	-0.38	-0.55	-0.73
XIII. Articles of stone, plaster, ceramics, glass and other similar materials	1.89	2.20	2.33
XV. Common metals and articles thereof	1.08	0.97	1.03
XVI. Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus	-2.15	-2.43	-2.15
XVII. Means and materials for transportation	-2.95	-2.89	-3.01
XVIII. Instruments and optical machinery	-4.04	-4.52	-4.49
XX. Goods and diverse products	-0.67	-0.80	-0.85
XXII. Other products not elsewhere specified or included	-4.51	-6.38	-3.98

Source: data processing – National Institute of Statistics, 2020

In Constanța County, the comparative advantages are registered for the following sections of the Combined Nomenclature: Live animals and animal products, Vegetable products, Mineral products.

Table no. 22. Comparative Advantage Index, Constanța, 2017 – 2019

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
I. Live animals and animal products	1.63	1.66	1.87
II. Vegetable products	1.26	1.63	1.58
III. Animal or vegetable fats and oils	0.04	0.07	0.20
IV. Food, beverages and tobacco	-0.71	-0.41	-0.43
V. Mineral products	2.25	2.46	2.50
VI. Chemical products	-1.94	-2.14	-2.13
VII. Plastic materials, rubber and articles thereof	-0.20	-0.16	-0.42
VIII. Raw hides, skins articles thereof	-2.91	-2.73	-3.13
IX. Wooden products, excluding furniture	-0.68	-0.47	-0.65
X. Paper and articles thereof	-3.78	-7.30	-6.87
XI. Textiles and articles thereof	-2.20	-2.43	-2.81
XII. Footwear, hats, umbrellas and similar articles	-4.01	-4.59	-7.10
XIII. Articles of stone, plaster, ceramics, glass and other similar materials	-1.34	-1.61	-1.69
XV. Common metals and articles thereof	-1.40	-1.31	-1.24
XVI. Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus	-3.49	-3.66	-3.10
XVII. Means and materials for transportation	0.21	-1.94	-1.99
XVIII. Instruments and optical machinery	-4.91	-5.08	-4.93
XX. Goods and diverse products	-3.63	-4.02	-4.13
XXII. Other products not elsewhere specified or included	0.08	-0.04	-0.06

Source: data processing – National Institute of Statistics, 2020

In Galati county, the comparative advantage index is higher than 1 for the following sections: Animal or vegetable fats and oils and Base metals and articles thereof.

Table no. 23. Comparative Advantage Index, Galați, 2017 – 2019

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
I. Live animals and animal products	-1.38	-1.48	-1.76
II. Vegetable products	-0.12	-0.84	0.02
III. Animal or vegetable fats and oils	2.24	2.43	2.37

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
IV. Food, beverages and tobacco	-0.90	-0.39	-0.84
V. Mineral products	-2.16	-2.05	-2.91
VI. Chemical products	-1.15	-1.35	-1.63
VII. Plastic materials, rubber and articles thereof	-2.58	-2.73	-2.73
VIII. Raw hides, skins articles thereof	-3.19	-8.07	-7.61
IX. Wooden products, excluding furniture	-1.95	-2.69	-2.76
X. Paper and articles thereof	-2.35	-3.30	-3.37
XI. Textiles and articles thereof	-2.23	-2.85	-3.13
XII. Footwear, hats, umbrellas and similar articles	-3.01	-5.82	-6.55
XIII. Articles of stone, plaster, ceramics, glass and other similar materials	-1.95	-2.75	-2.70
XV. Common metals and articles thereof	2.07	2.07	2.10
XVI. Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus	-1.77	-1.89	-1.79
XVII. Means and materials for transportation	-0.23	-0.27	-0.44
XVIII. Instruments and optical machinery	-3.63	-5.13	-4.16
XX. Goods and diverse products	-2.32	-2.68	-2.38
XXII. Other products not elsewhere specified or included	-3.46	-2.71	-4.23

Source: data processing – National Institute of Statistics, 2020

In Tulcea County, the Comparative Advantage Index is higher than 1 for the following sections: Live animals and animal products and base metals and articles thereof. In the period 2017 - 2019 we notice that there was a decrease in the comparative advantages of the county for plant products, chemicals and textiles and textile articles, the comparative advantage index obtaining subunit values in the last year of analysis.

Table no. 24. Comparative Advantage Index, Tulcea, 2017 – 2019

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
I. Live animals and animal products	1.80	0.99	1.40
II. Vegetable products	1.33	0.22	0.20
III. Animal or vegetable fats and oils	-3.64	-1.84	-0.58
IV. Food, beverages and tobacco	-0.84	-2.80	-1.90
V. Mineral products	-1.31	-3.40	-3.39
VI. Chemical products	1.06	1.06	0.68
VII. Plastic materials, rubber and articles thereof	-2.89	-4.63	-5.14
VIII. Raw hides, skins articles thereof	-3.36	NA	NA
IX. Wooden products, excluding furniture	-1.76	-4.29	-5.05
X. Paper and articles thereof	-2.61	-5.38	-5.76

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
XI. Textiles and articles thereof	1.08	0.39	0.81
XII. Footwear, hats, umbrellas and similar articles	-3.32	-9.39	NA
XIII. Articles of stone, plaster, ceramics, glass and other similar materials	0.16	-1.16	-0.65
XV. Common metals and articles thereof	-1.03	1.16	1.29
XVI. Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus	-2.04	-1.93	-1.87
XVII. Means and materials for transportation	0.49	0.70	0.53
XVIII. Instruments and optical machinery	-4.08	-3.69	-3.59
XX. Goods and diverse products	-1.71	-2.20	-2.38
XXII. Other products not elsewhere specified or included	-3.67	-5.07	-4.55

Source: data processing – National Institute of Statistics, 2020

In Vrancea County, the sections for which the county has an ICA> 1 are: Paper and articles thereof and Textiles and textile articles.

Table no. 25. Comparative Advantage Index, Vrancea, 2017 – 2019

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
I. Live animals and animal products	-0.66	-3.14	-2.51
II. Vegetable products	-2.22	-2.26	-2.66
III. Animal or vegetable fats and oils	-3.65	NA	NA
IV. Food, beverages and tobacco	-1.99	-2.82	-1.96
V. Mineral products	-4.66	-7.71	-8.09
VI. Chemical products	-1.15	-1.67	-2.06
VII. Plastic materials, rubber and articles thereof	-1.27	-0.79	-1.10
VIII. Raw hides, skins articles thereof	-0.66	-0.73	0.03
IX. Wooden products, excluding furniture	0.45	0.41	0.60
X. Paper and articles thereof	1.55	1.60	1.56
XI. Textiles and articles thereof	2.47	2.56	2.62
XII. Footwear, hats, umbrellas and similar articles	-2.05	-8.55	-6.17
XIII. Articles of stone, plaster, ceramics, glass and other similar materials	-0.12	-0.38	0.01
XV. Common metals and articles thereof	-0.98	-0.87	-0.68
XVI. Electrical machinery, apparatus and equipment, sound or image recording or reproducing apparatus	-2.13	-2.16	-2.01
XVII. Means and materials for transportation	-2.12	-2.02	-1.94

Sections and chapters of the combined nomenclature (NC)	2017	2018	2019
XVIII. Instruments and optical machinery	-2.63	-2.30	-2.38
XX. Goods and diverse products	-1.52	-1.64	-1.64
XXII. Other products not elsewhere specified or included	-2.14	-2.32	-1.22

Source: data processing – National Institute of Statistics, 2020

b) Regional analysis of the field of Research, Development, Technology transfer and Digitization

Research, development and innovation activity is supported at national level through the National Strategy for Research, Development and Innovation, the first one being elaborated for 2007 – 2013 period, the second one for 2014 – 2020 period (which also includes smart specialization for the national level), and it is expected to have by the end of 2020 the have the National Strategy for Research, Development and Innovation, National Strategy for Smart Specialization and the National Plan for RDI 2021 – 2027.

Governmental decision no. 24/2020 from 16 January 2020 regarding the organization and functioning of the Ministry of Education and Research regulates the organization and management of the national system of education, professional training, scientific research, technological development and innovation, and exercises the powers established by law and other normative acts. Among the attributions of the Ministry in the analyzed field, according to the mentioned GD, the relevant ones are the realization of studies, analyzes, monitoring in the field in order to facilitate the implementation of the Strategy, the National Research-Development and Innovation Plan and other instruments, establishing and updating strategic objectives. , elaboration of the National Research-development Plan, monitoring of the research-development units, ensuring the development of the coordinated entities, stimulating the development of the economic operators, planning the budgets, financing the projects, etc.[17].

Expenditures on research and development

Expenditure on research and development indicates the level of political interest in this area, i.e the extent to which it is considered to be a priority, and therefore funded. These expenses can bring additional revenue to the state budget as it facilitates technological advancement and creates competitive advantages.

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[17] GD 24/2020, Chapter III, Art. 5, B

Expenditures for research and development as a share of GDP were lower in 2019 compared to 2014, Romania being the state with the lowest allocation for this field among all EU countries. If in 2014 they reached 2,555,662 thousand lei and represented 0.6% of GDP, in 2019 they were 4,769,279 thousand lei, representing 0.52% of GDP. In the European Union, the countries that pay the most attention to research and development are Germany (2.15%), Denmark (1.79%), the Netherlands (1.66%) and Greece (1.65%). The graph below shows the situation of resource allocation to the research and development sector, comparing the values in 2014 with those in 2019.

Figure no. 863. Expenditures on research and development as share of GDP, EU, 2014 vs. 2019
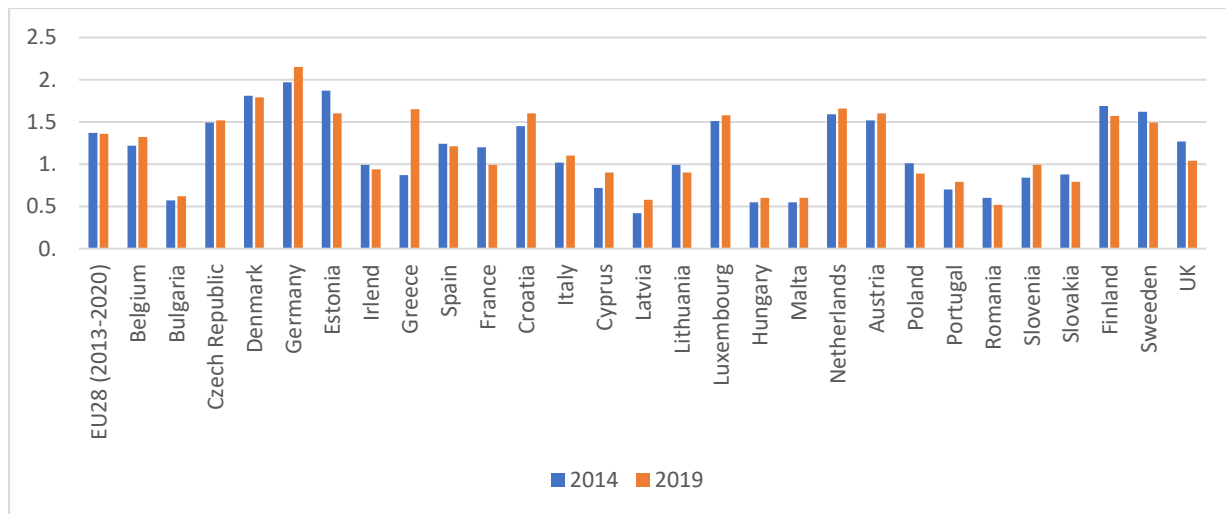
At national level, the expenditures for the research and development activity experienced constant increases from 2014 to 2019. Most expenditures are made from public funds, followed by those from the funds of economic agents. Both categories of expenditures experienced significant increases, so that those supported by public funds increased 1.3 times in the period 2014-2018, while the expenditures made by economic agents registered an increase of 3.3 times, in the same reference range.

Figure no. 874. Total expenditures from research and development on funding sources
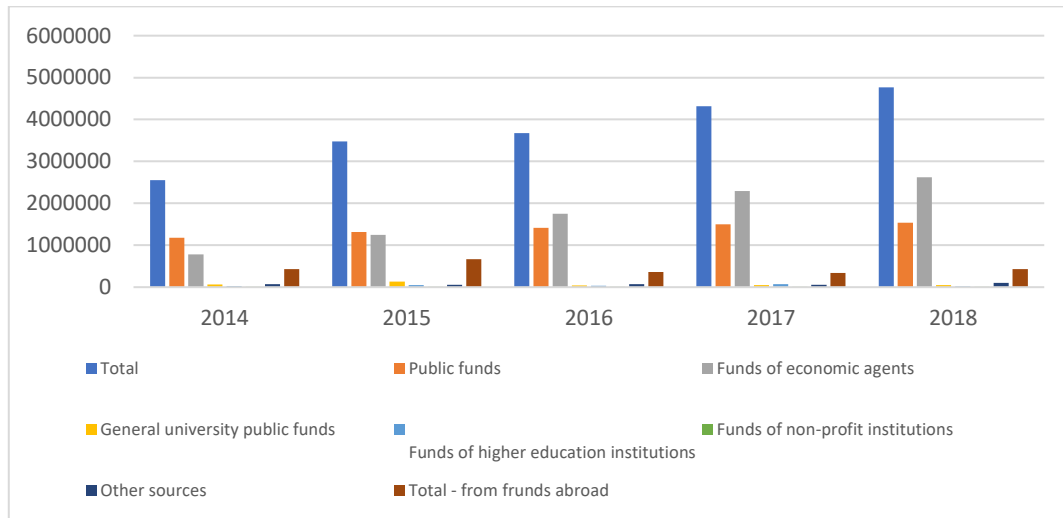
<div align="right">Source: Data processing - National Institute of Statistics 2020</div>

The classification of expenditures for research and development activity by performance sectors reveals an increase in the business sector, for the entire analyzed period. In the case of expenditures in the higher education sector, they experienced an increase for the period 2014 - 2015 (388,960 thousand lei and 606,508 thousand lei, respectively), so that in 2016 (415,902 thousand lei) to decrease sharply, the subsequent increases failing to bring the value to the level of 2015 (in 2017 they were 459,222 thousand lei, and in 2018, 467,722 thousand lei). The same situation was registered for the expenditures in the government sector, but in 2018 they exceeded the value reached in 2015. The following graph follows the evolution of these expenditures by performance sectors.

Figure no. 885. Total expenditures from the research-development activity on performance sectors, thousand lei
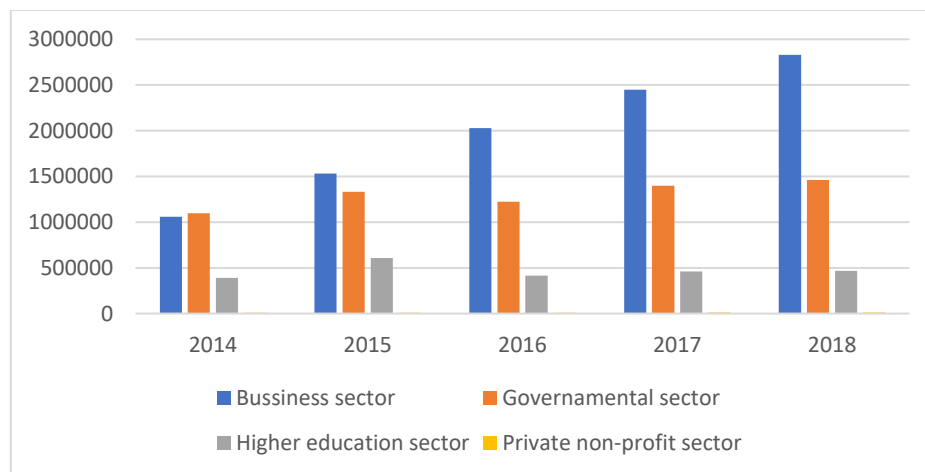
<div align="center">Source: Data processing - National Institute of Statistics 2020</div>

Regarding the expenditures with research and development activity, these are also increasing, except two regions, North – Est and North – East. Bucharest-Ilfov is the region with the highest expenditures, and South-East is the one with the lowest expenditures on research and development.

The total expenses from the research - development activity from the enterprise sector, by CAEN activities Rev. 2, at the national level are presented in the following figure. It can be observed that the highest expenses were made in 2018, in the manufacturing industry.

Figure no. 896. Total expenditures from the research-development activity in the enterprise sector, CAEN activities Rev.2
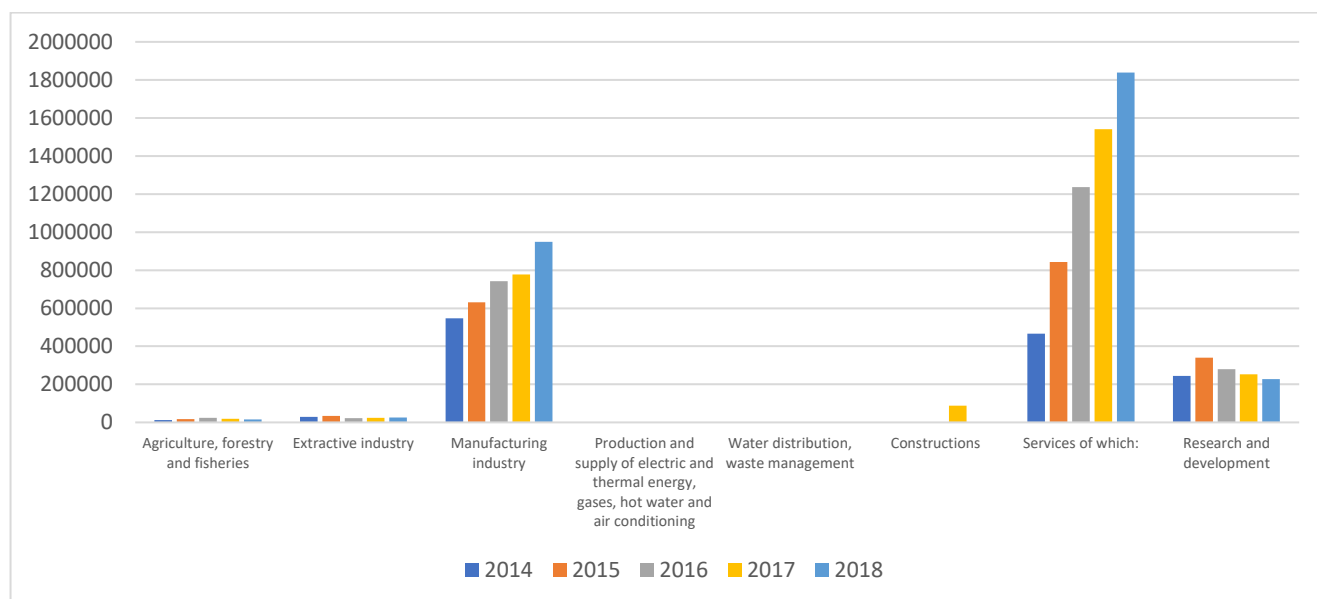
Source: Data processing - National Institute of Statistics 2020

Regarding the total expenditures from the research - development activity, by types of research - development programs, according to NABS[18] 2007, the following figure captures their evolution in the period 2014 - 2018. It is noted that most expenditures were made with general knowledge activities, funded from sources other than general university funds, followed by university funds. Thus, only the university field is the one that develops research - development programs, the share of other expenses being much smaller. Transport, telecommunications and other infrastructures, as well as political and social systems, structures and processes are the areas where the total expenditure on research and development is the lowest.

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[18] The Nomenclature for the Analysis and Comparison of Scientific Programs and Budgets (NABS 2007) is a functional classification for the analysis of public funding for research and development (R&D) based on the socio-economic objectives pursued by central governments or declared by them in elaborating their budgets and programs, as opposed to the breakdown by institutions or groups of institutions to which funds are allocated. It also facilitates international comparisons by minimizing the influence of distortions resulting from differences between national research and development systems.

Figure no. 907. Total expenditures from the research-development activity by types of research-development programs, according to NABS 2007 - current prices at national level during 2014 - 2018
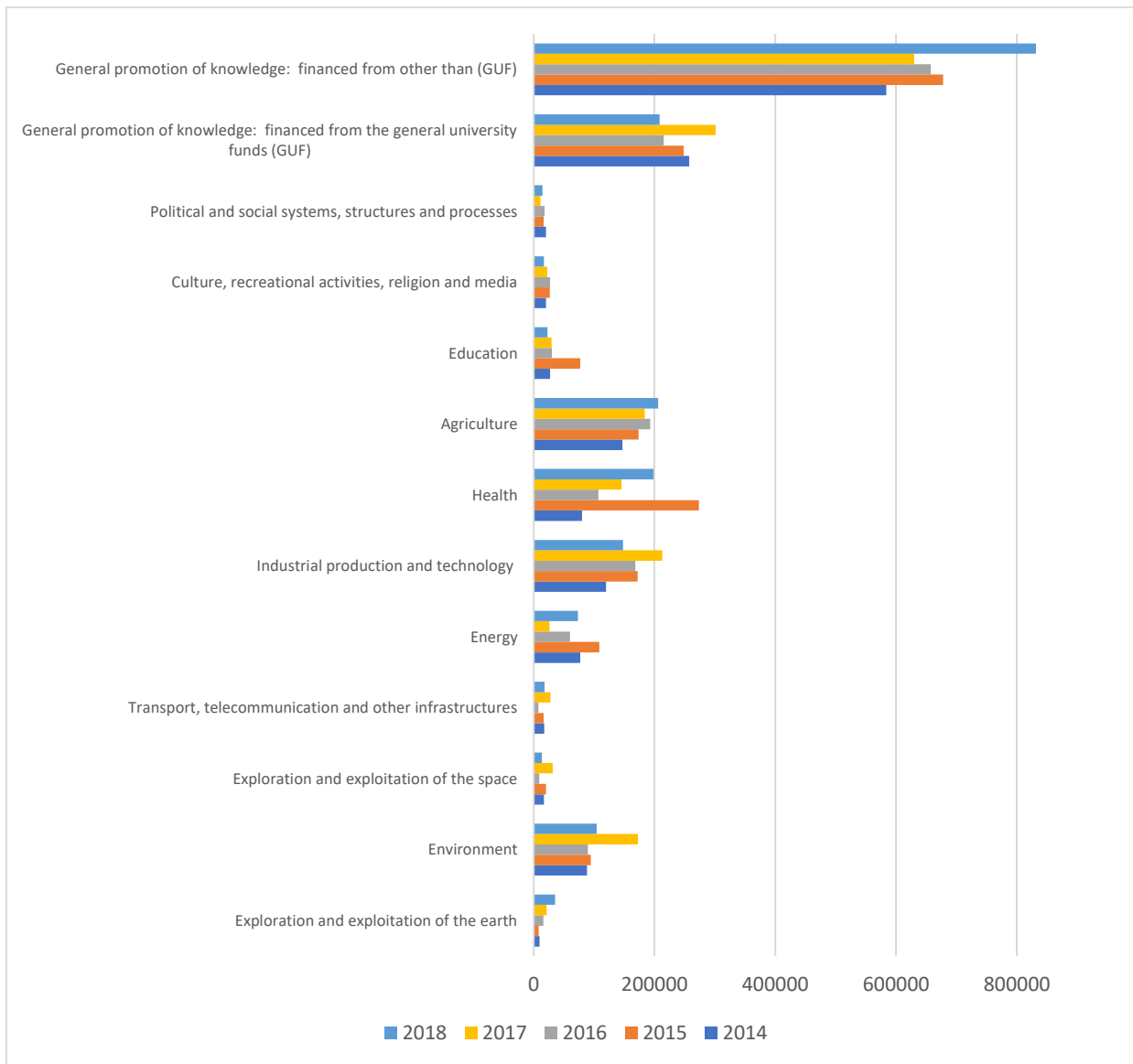
Source: Data processing - National Institute of Statistics 2020

The regional disparities in terms of research and development expenditures are very large, the Bucharest - Ilfov region being the one with the highest values, and the differences between it and the rest of the regions are significant. The South-East region registers the lowest expenditures for the entire analyzed period, respectively 2014 - 2018. The trend is slightly upward, but this very low growth rate deepens the inequalities already created compared to the rest of the regions.

Figure no. 918. Expenditures with the research-development activity at the level of each development region, thousand lei
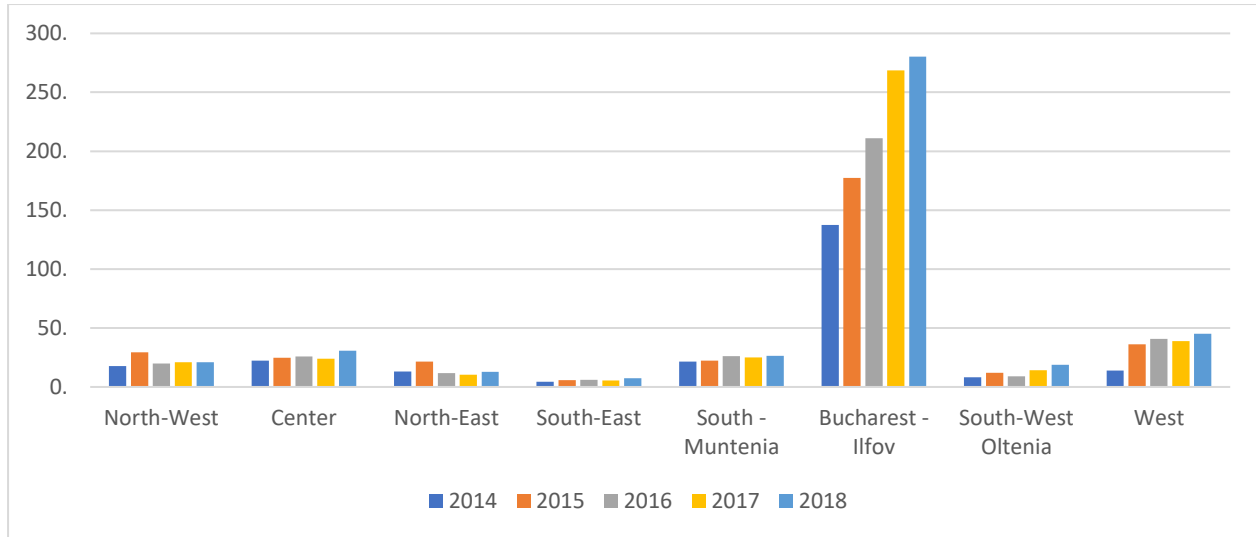
Source: Data processing - National Institute of Statistics 2020

A more detailed look at the expenditures at the level of the counties in the South-East Region reveals that there are counties in which lower values were registered in 2018 compared to the previous year (Brăila, Constanța, Vrancea) and that none of the counties knew a steady growth, with at least one year in which expenditure figures were lower than in the previous year.

The graph below shows the situation of research and development expenditures at the level of each county in the South-East Region, highlighting the differences registered between counties, during the time interval 2014-2018.

Figure no. 929. The evolution of the expenses with the research-development activity, thousand lei

Source: Data processing - National Institute of Statistics 2020

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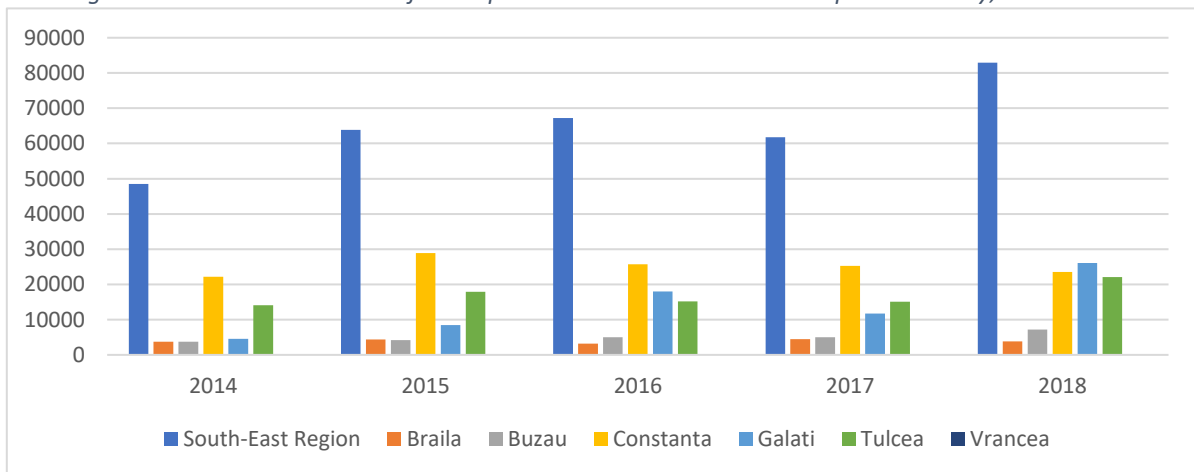
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Personnel in the R&D activity

Expenditures on research and development are also reflected on the labor market, the states with lower GDP expenditures dedicated to this field being those with a small number of employees. In 2017, the last for which data are available on Eurostat, at EU level (28 countries) 4,873,505 people were employed in the field of research and development (EU 27, in 2017 there were 4,043,689). As can be seen in the chart below, the states with the most people employed in this field are Iceland, Denmark, Finland and Austria, at the opposite pole being, in descending order, Bulgaria, Croatia, Cyprus, Romania.

Figure no. 100. Number of employees in the R&D Sector, EU Level
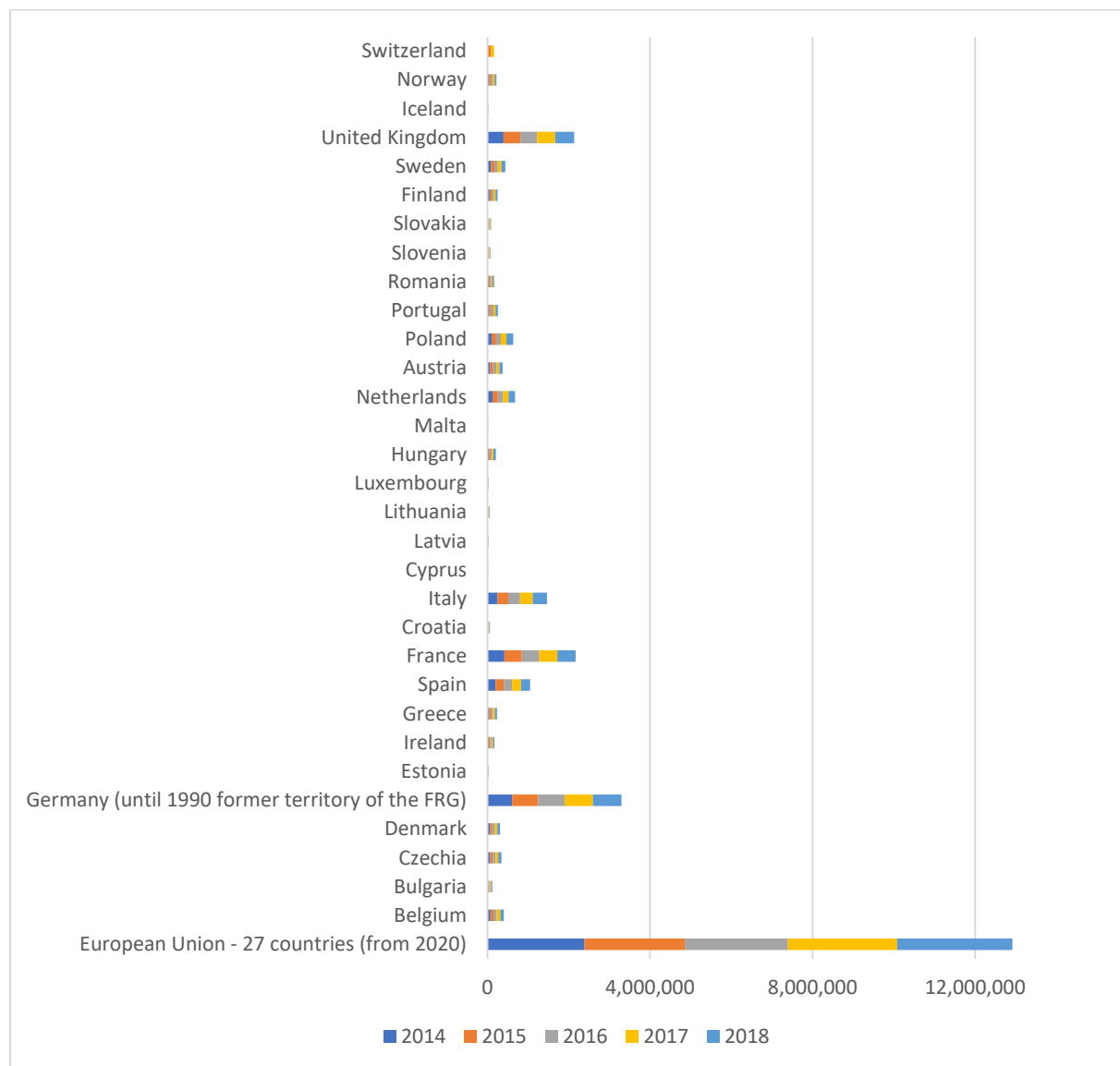
Source: Data processing - Eurostat 2020

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At national level, the number of employees in research and development is a constant one, the variations being small starting with 2016, registering a stabilization around 44,000, as can be seen in the following table. The largest increase in the number of employees at national level was registered between 2015-2016, when 938 new employees joined the research and development field. For the last analyzed period, 2017-2018, the number of employees decreased by 68 people.

The graph below follows the number of employees, illustrating the differences from year to year, starting with 2014 until 2018. For 2019, no data are available.

Figure no. 101. Evolution of the number of employees in the field of research and development at national level
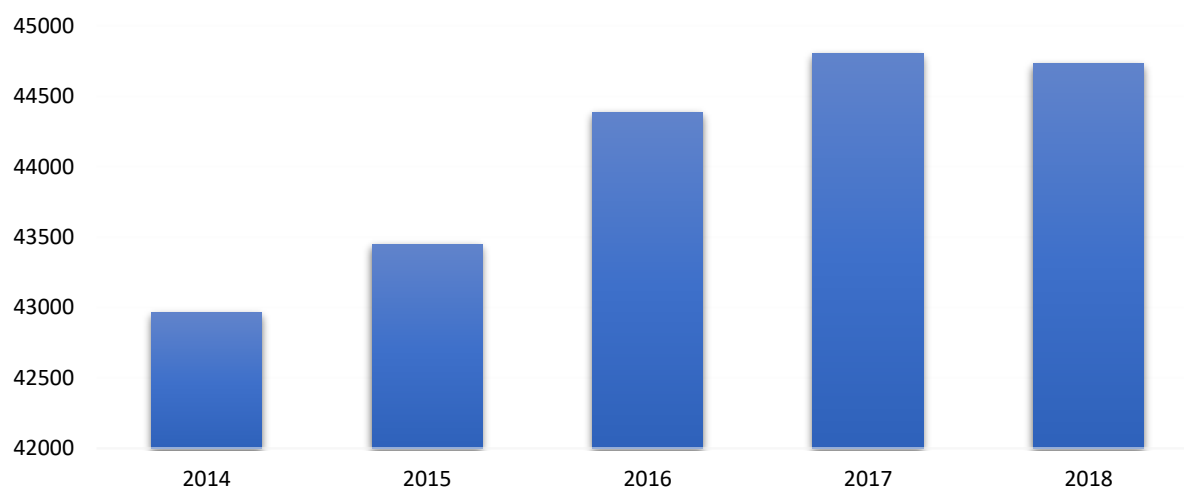
Source: Data processing - National Institute of Statistics 2020

At the regional level, the number of employees in research and development has increased in recent years, the highest value of this increase being recorded in 2017 and 2018, when 189 people joined this field. It is noted that the period of increase in the number of employees at regional level coincided with the period of decrease in the number of employees at national level, the region being in contradiction with the national dynamics in the field of research and development. Thus, the table below shows the number of employees in the South-East Region. In order to highlight the evolution of the number of employees in the research-development activity, the chart below follows the values registered between 2014 and 2018, for 2019 no data available.

Figure no. 102. Evolution of the number of employees in the research-development activity at the level of the South-East Region
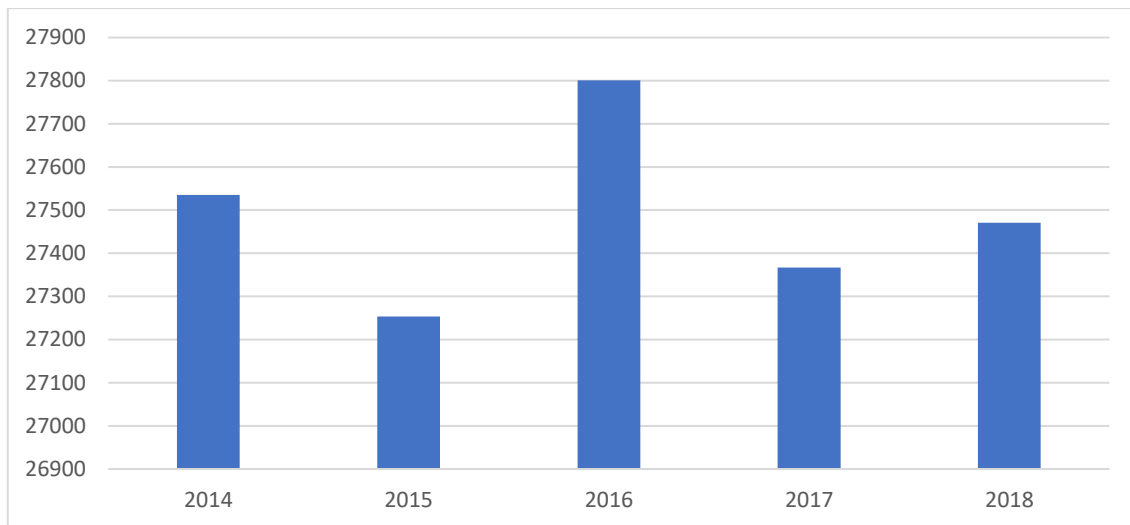
Source: Data processing - National Institute of Statistics 2020

Patents, designs, trademarks

In order to track the degree of innovation of a state or a region, the number of patents, the number of applications for registration of designs, and the number of applications for trademark applications are very relevant.

At the national level, the number of patent applications has been constant, with increases and decreases being very small (see table below). According to OSIM, the patent gives the owner the right to prohibit third parties from undertaking, without his consent, the following actions:

- in the case of products, manufacturing, marketing, offering for sale, use, import or storage, for marketing, offering for sale or use;
- in the case of procedures or methods, their use.

The right to the patent belongs to the inventor or his successor, and in the case of salaried inventors, the right may belong to both the company and the person, depending on the provisions of the law and/ or the agreement between the parties. The validity period of the patent is 20 years from the filing date, the condition being the payment of the maintenance fees in force. The publication of patent applications takes place after 18 months from the date of the national regulatory filing, which benefit from temporary protection until the patent is issued (OSIM, 2017).

The dynamics of the number of patent applications is shown in the graph below. It can be easily seen that in 2018 and 2019 there were fewer applications than in previous years.

Figure no. 103. Evolution of the number of patent applications at national level
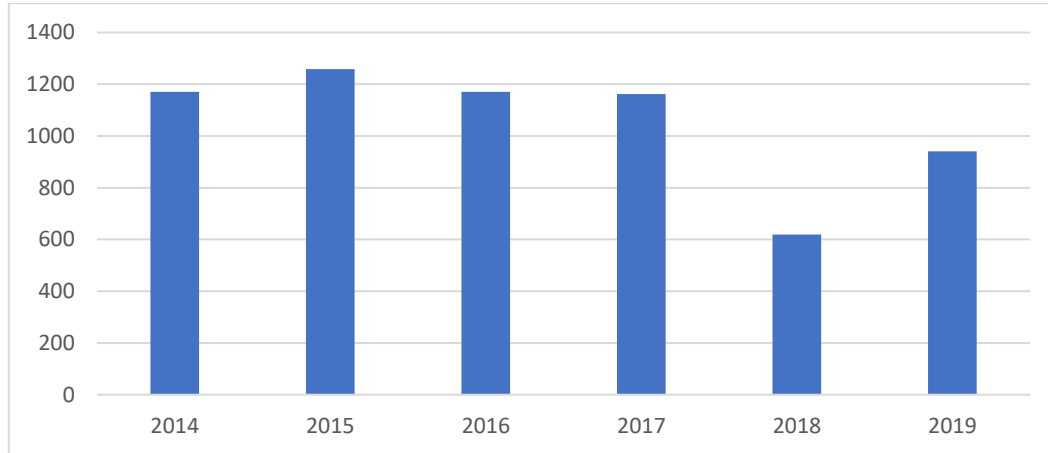
Source: Data processing - National Institute of Statistics 2020

The classification of these data according to the categories of Romanian applicants reveals the largest share of the total number of patent applications in the category "Individuals". The next category of Romanian applicants in terms of the number of patent applications is that of research institutes. The following graph illustrates the evolution of the number of patent applications, starting with 2014, until 2019.

Figure no. 104. Patent applications distributed by categories of Romanian applicants
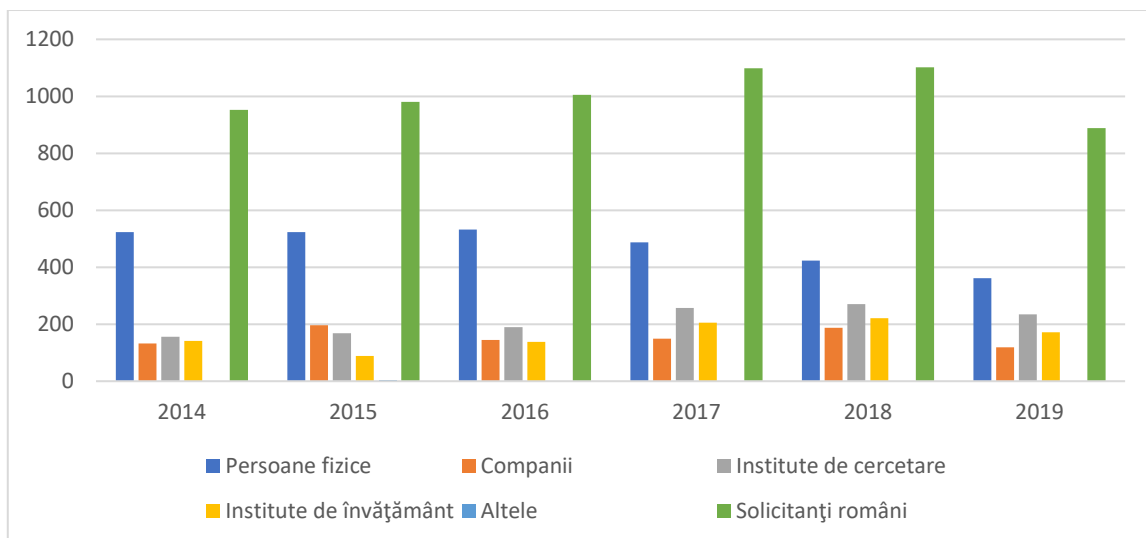
Source: Data Processing - Annual Report of the State Office for Inventions and Trademarks, 2018 (2019)

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European patents validated in Romania are also an important indicator to understand the evolution of the national context in the field of research and development. These are in a continuous increase since 2014, having in the last year for which data are available, 2019, the highest value recorded - 4329. It can be noted that these increases are considerable, from 2014 to 2019 the number of these European patents they almost doubled in Romania: in 2014 there were 2661, in 2015 - 2733, in 2016 - 3295, in 2017 3709, and in 2018 - 4025. The evolution of the number of European patents is illustrated in the figure below.

Figure no. 105. European patents validated in Romania
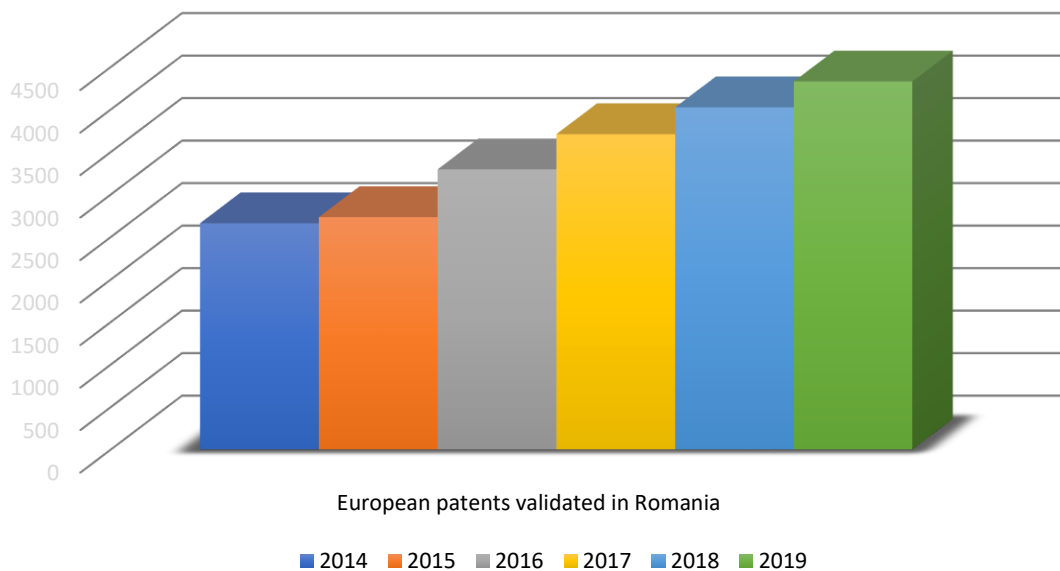
European patents validated in Romania

■ 2014 ■ 2015 ■ 2016 ■ 2017 ■ 2018 ■ 2019

Source: Data Processing - Annual Report of the State Office for Inventions and Trademarks, 2018 (2019)

Regarding the number of patent applications in the South-East Development Region, it reveals a disproportionate territorial distribution, most applications being registered in Buzau (in 2016 there were 185 applications, the number gradually decreasing to 100 in 2019), and the least in Tulcea (where 2 applications were registered in 2015, 2016, 2017 and 1 application in 2018 and 2019) and in Vrancea (having 1 application registered in 104, 2018, 2019, and 2 applications in 2015, 2016 and 2017). In 2017, no patent application was registered in Brăila. In Constanța County, in the period 2014-2016, 20, 16 and 14 patent applications were registered, respectively, while in 2017-2019, 8 applications were registered. Galați is the only county where an increasing trend can be noticed since 2015, with a slight decrease in 2019. The number of patent applications in this county for the period 2014 - 2019 is 25, 12, 13, 21, 24 and 23. Chart The following illustrates the evolution of the number of patent applications in all 6 counties of the South-East development region.

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Figure no. 106. Patent applications distributed by administrative units
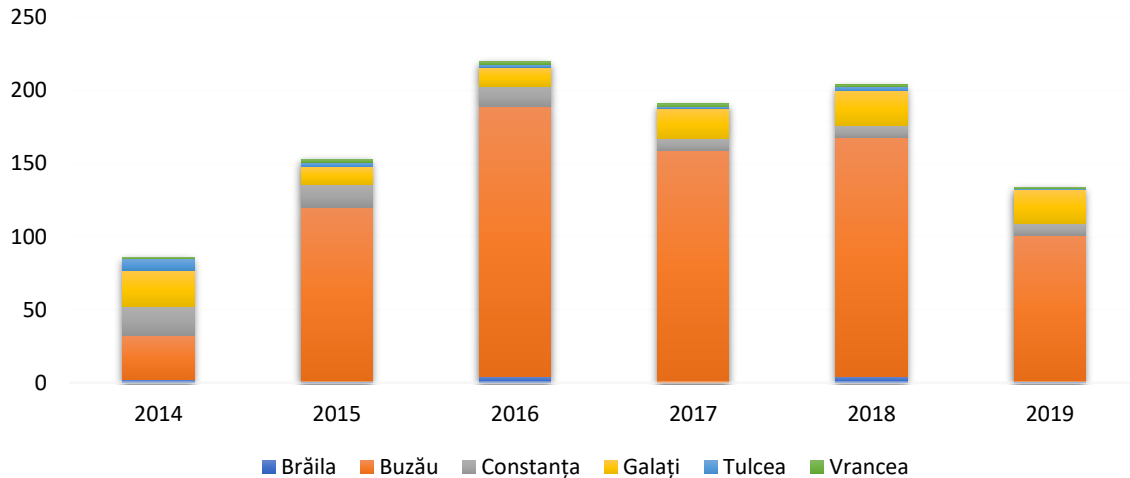
Source: Data Processing - Annual Report of the State Office for Inventions and Trademarks, 2018 (2019)

The legislation regulating the protection of designs is formed by Law no. 129/1992 on the protection of designs, with the amendments published in the Official Gazette of Romania, Part I, No. 242 / 04.IV.2014, H.G. no. 211/2008 for the approval of the Regulation for the application of Law no. 129/1992 and GO no. 41/1998 on taxes in the field of industrial property protection and the regime of their use, with subsequent amendments and completions, with values updated on 01.01.2020.

According to art. 2, lit. d of Law no. 129/1992 on the protection of designs, with subsequent amendments and completions, the design represents the external appearance of a product or part thereof, rendered in two or three dimensions, resulting from the combination of the main features, in particular lines, contours, colors, shape, texture and / or materials of the product itself and / or its ornamentation.

Regarding the validity of the protection, the title of protection for a design is valid for a period of 10 years from the date of establishment of the regular deposit and can be renewed for 3 successive periods of 5 years, provided the payment of taxes in the amount and legal terms established.

The evolution of the number of applications for registration of designs in the period 2014 - 2019 can be followed in the following chart, noting the lowest number in 2017 and the highest in 2019.

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Figure no. 107. Evolution of the number of applications for registration of designs at national level
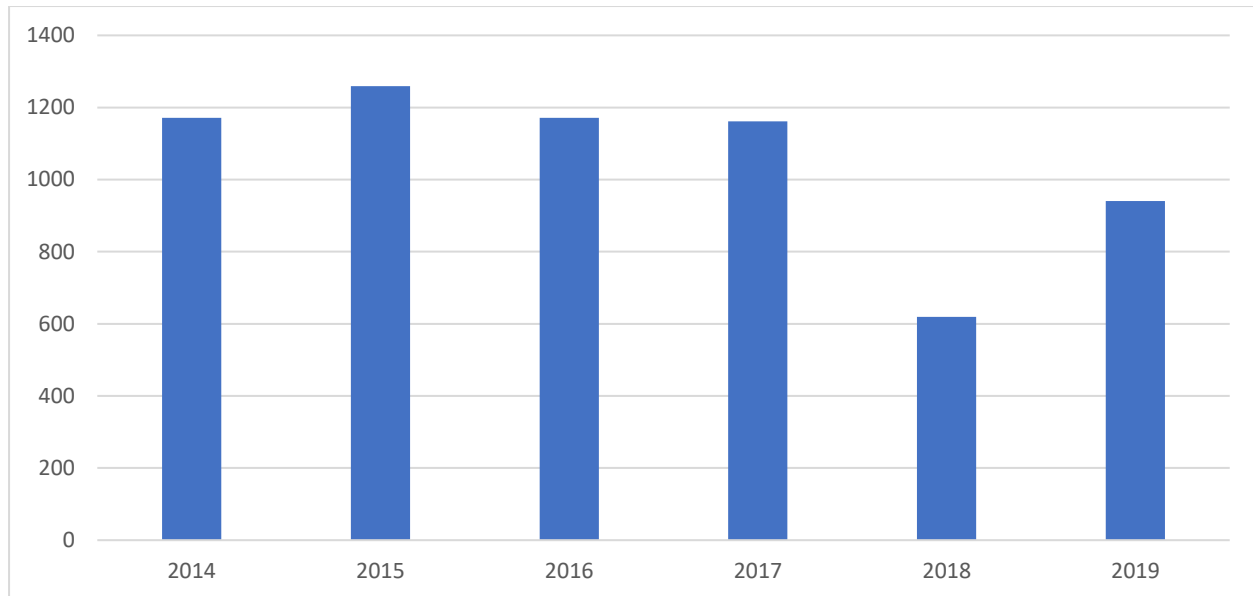
Source: Data Processing - Annual Report of the State Office for Inventions and Trademarks, 2018 (2019)

The number of applications for registration of designs in each county was analyzed, noting that the highest value is found in Galati county, where there was a slight increase from 2014 (when 9 applications were registered) in 2018 (when the number of applications had reached 19). In 2019, the decrease was significant, about 3 times (6 applications). Constanța is the next county in terms of number of applications for registration of designs, the highest being in 2015 when there were 12 applications. Subsequently, their number decreased, in 2018 and 2019 being only 4 registered applications. Buzău and Brăila have similar situations, none of the counties registering more than 5 applications per year in the entire analyzed period. Tulcea and Vrancea also have a similar situation, but in half of the analyzed period, the mentioned counties did not have any application for registration. Moreover, Vrancea had, in fact, only one year (2016) in which applications were registered (5), in the others their number being 0.

Figure no. 108. Applications for registration of designs, distributed by administrative units
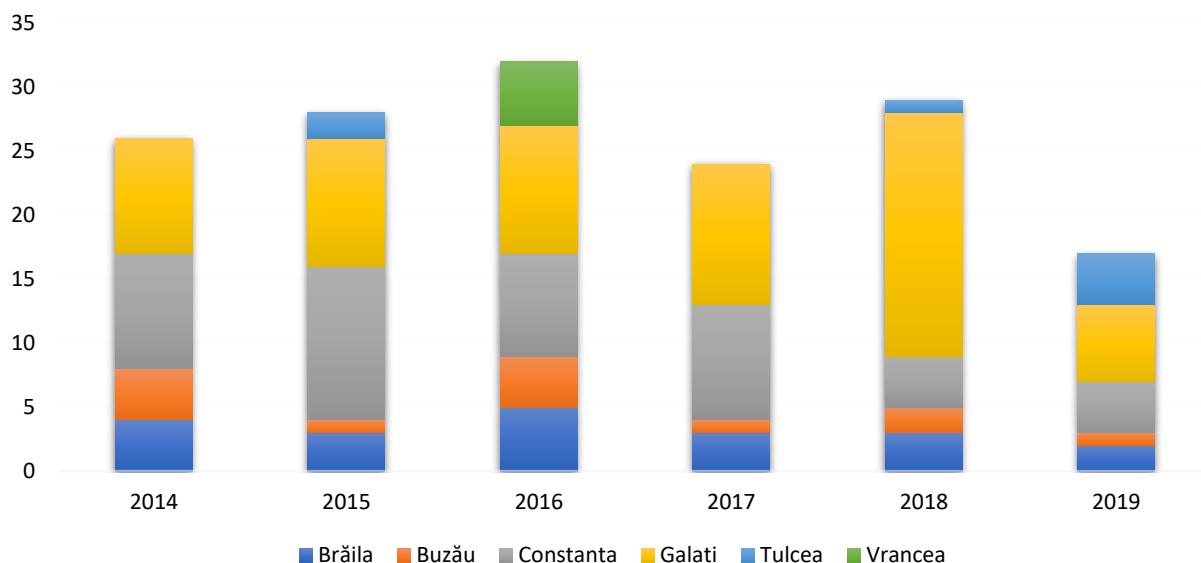
Source: Data Processing - Annual Report of the State Office for Inventions and Trademarks, 2018 (2019)

Brands are key elements of business strategies, distinguishing between their own products and those of the competition. It is the way in which a company attracts new customers and retains existing ones, and for customers, it is the most convenient way to recognize the category of relevant services / products.

The dynamic of the number of trademark applications at national level can be followed in the following graph. The year with the lowest number of applications is 2017 (10,369), and the year with the most is 2019 (11,257).

Figure no. 109. Evolution of the number of trademark applications at national level
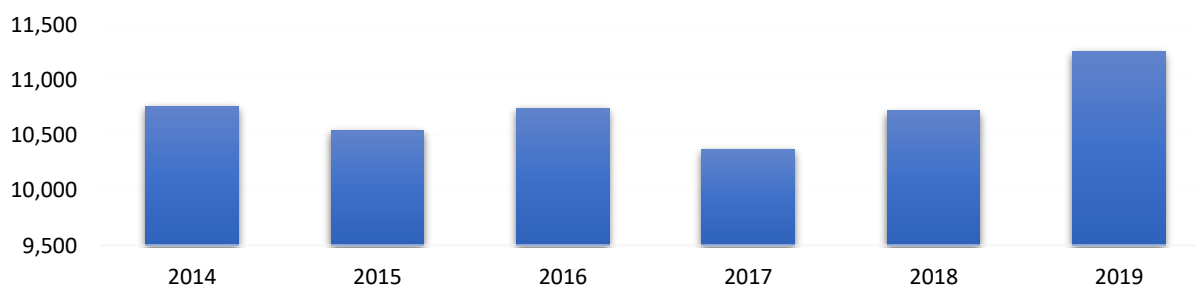
Source: Data Processing - Annual Report of the State Office for Inventions and Trademarks, 2018 (2019)

At the level of the counties in the South-East development region, the number of trademark applications places Constanța on the first place, with a number almost double that of Galați, the county

on the second position. Thus, most trademark applications were filed in 2019, 374. The fewest applications in Constanța County were registered in 2016, 232. In Galați, registration applications increased slightly from 115, in 2014, to 152, in 2017, so that in the last two years to decrease, reaching 133 in 2019. In Brăila, Buzău and Vrancea the number of applications did not exceed in any year 70. Tulcea, although it registered in 2018, 72 applications, in the rest of the years their number was the lowest in the Region. The following graph shows the evolution of the number of trademark applications, distributed by counties.

Figure no. 110. Trademark applications, distributed by administrative units
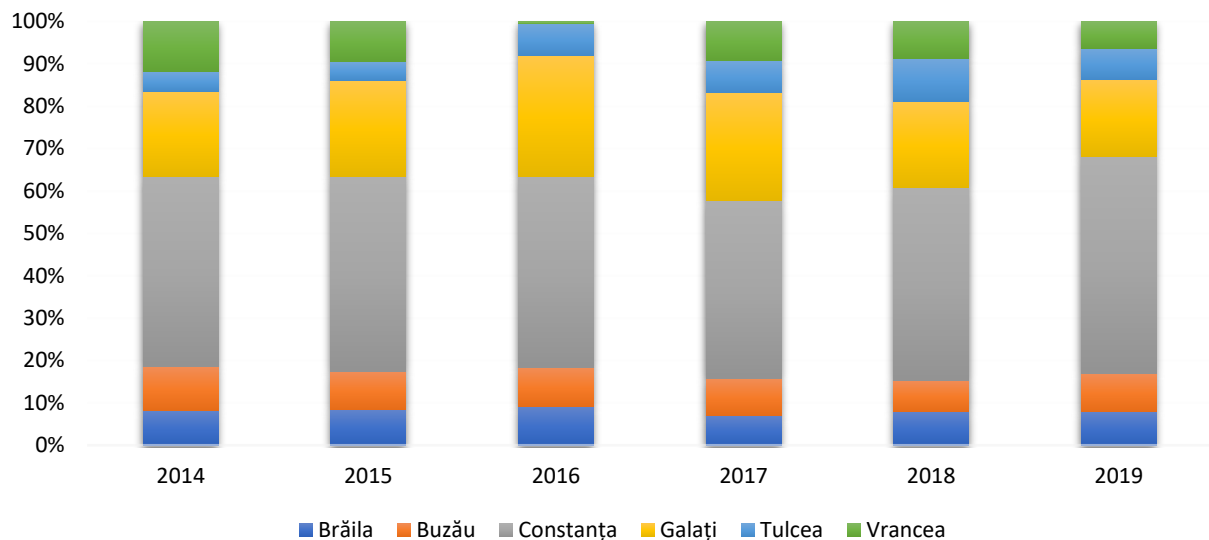
Source: Data Processing - Annual Report of the State Office for Inventions and Trademarks, 2018 (2019)

The research-development activity is also carried out through the national research-development institutes that function under the coordination of the Ministry of Education and Research. According to Ordinance no. 57/2002, the national research institute is a form of legal organization, which is registered as such in the Trade Register, which operates on the basis of economic management and financial autonomy and which is established by Government decision. The obligations of these institutes that benefit from funding and from public funds are related to the development, updating of scientific bases and documentation, monitoring of technology transfer, efficient management, elimination of the possibilities to generate acts of unfair competition. The South-East region has 3 such institutes on its territory, respectively:

- The National Research-Development Institute "Danube Delta" - INCDDD Tulcea whose research activity is focused on achieving the objectives of managing the largest protected area in Romania, thus achieving:

- assessment of the ecological status of the natural heritage and elaboration of the necessary measures for the conservation of biodiversity;
- monitoring of flora and fauna species and environmental factors;
- assessment of the state of natural resources and the level of capitalization, in accordance with the regeneration potential and the support capacity of ecosystems;
- elaboration of hydrological scenarios to assist the ecological reconstruction measures in order to improve the water circulation on the existing canal network.
- measures for the recovery of endangered species populations - fish, birds, reptiles, mammals;
- elaboration of technical solutions for the renaturation of abandoned agricultural and fishing premises, in order to expand the natural habitats for fish and bird species;
- modeling the basic processes in the functioning of aquatic ecosystems;
- support studies for the harmonization of socio-economic interests with the concept of conservation of natural capital and for increasing the quality of life and the standard of civilization;
- development of the Geographic Information System for the Danube Delta.

- National Research-Development Institute for Marine Research "Grigore Antipa" - INCDM Constanța with the fields of activity aimed at:
  o sedimentology and coastal morphodynamics;
  o hydrology and marine physics;
  o marine biology and microbiology;
  o marine chemistry and biochemistry;
  o marine ecology and radiobiology;
  o applied ecology and aquaculture;
  o marine pollution;
  o management of fishery resources;
  o marine engineering and technology;
  o ecological protection and improvement of coastal lakes.

- The National Research - Development Institute for Marine Geology and Geoecology - GeoEcoMar, based in Bucharest and Constanța, operates in order to:
  o deepen the complex, interdisciplinary knowledge of the marine environment;
  o identifies new marine resources;
  o knows the structure and functioning of specific ecosystems for the macro-geosystem Danube - Danube Delta - Black Sea;
  o study global changes, the impact of human activities;
  o develops / proposes new technologies;

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- o develop strategies, diagnostic studies and prognosis on the development of the field of science and / or the sector in which it operates.
- The Research-Development Institute for Aquatic Ecology, Fisheries and Aquaculture Galati (ICDEAPA Galati) is a key player in research in the South-East Region, and among its partners are institutions such as the University "Lower Danube" in Galati. The activities of the institute are related to:
  - o Research in aquaculture;
  - o Microproductions;
  - o Fundamental research and applied research;
  - o Technological transfer of research;
  - o Fish farming and ancillary services.
- The Research-Development Institute for Sheep and Goat Breeding Palas Constanța (ICDCOC-Palas) coordinates at national level the research activity in the field of sheep and goat breeding collaborating with other research stations in Bacău, Caransebeș, Botoșani, etc., but also with the Universities of Agronomic Sciences and Veterinary Medicine in Bucharest, Iași, Timișoara and Cluj-Napoca. The research activity of the institute is carried out within four main areas, namely:
  - o Genetics and breeding;
  - o Reproduction;
  - o Nutrition and breeding and exploitation technologies for sheep.

The state higher education institutions that function under the coordination of the Ministry of Education and Research and that carry out their activity on the territory of the South-East Development Region are presented in the following tables, at regional and then county level.

Table no. 26. Higher education institutions in the South-East Region

Accredited higher education institutions or their structures	
Civil status higher education institutions:	"Ovidius" University of Constanța
	Maritime University of Constanța
	"Dunărea de Jos" University of Galați
Military higher education institutions	"Mircea cel Bătrân" Naval Academy from Constanța
Accredited private higher education institutions	"Danubius" University of Galati
	"Andrei Șaguna" University of Constanța
Private higher education institutions authorized to operate on a temporary basis	"Gaudeamus" Foundation - "Tomis" University of Constanța

Source: Education and Research Ministry, 2020

State or private universities that have branches / territorial centers in the South-East Region contribute to the development of the field, reaching people who do not have the option to travel to courses in another locality. The following table presents the main branches of state or private universities in the South-East Region.

Table no. 27. Branches of state or private universities in the South-East Region

County	Branch / territorial center
Brăila	"Constantin Brâncoveanu" University of Pitesti
Buzău	University of Bucharest - Faculty of Psychology and Educational Sciences
	Bioterra University - Engineering and Management in Public Food and Agrotourism - Buzău
	"Aurel Vlaicu" Military Institute
Constanța	"Spiru Haret" University of Bucharest
Tulcea	Ecological University of Bucharest
Vrancea	Bioterra University - Engineering and Management in Public Food and Agrotourism - Focșani
	"Transilvania" University of Brașov - ID Territorial Center
	The University of Bucharest
	"Danubius" University of Galati
	Bioterra University

Source: Ministry of Education and Research, 2020

Regarding the situation regarding research infrastructure, patents and scientific articles related to research institutions in the South-East Region, it is presented in the following table[19], according to the data collected from the European Research Infrastructure System[20]:

Table no. 28. Research infrastructure at the level of the South-East Region, according to EERIS

Tulcea			
Institution	Research infrastructure	Publications	Patents
"Danube Delta" National Research and Development Institute - INCDDD Tulcea	Chemistry lab Hydrology laboratory Laboratory of genetics and molecular ecology	According to the institute's website, 160 scientific articles have been published in the scientific annals of the Danube Delta Institute.	According to EPO, the National Research-Development Institute "Danube Delta" - INCDDD

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[19] Information on patents has been collected from the European Patent Office platform (https://www.epo.org/).
[20] https://eeris.eu/

Institution	Research infrastructure	Publications	Patents
	Department for Biodiversity Conservation and Sustainable Use of Natural Resources Department of Ecological Restoration and Species Recovery Center for the Study of Transboundary and Emerging Diseases and Zoonoses Department of Geomantics and Information Systems Department of Technological Development, Transfer and Spatial Planning	The DELTAICA publication was made in 5 volumes, the last volume being published in 2015. The volume PETARDA was published in 13 volumes, the last volume being published in 2006.	Tulcea does not have any patent registered at European level
Tulcea Eco-Museum Research Institute	Museum of History and Archeology Laboratory for the restoration and conservation of mobile heritage	In 2020, a number of research projects have been carried out in various fields, as follows: Archeology / History: 12 Publications Ethnography: 9 Publications Natural sciences: 5 Publications Art: 7 Publications Systematic archaeological research projects: 8 Publications	According to EPO, the Tulcea Eco-Museum Research Institute does not have any patent registered at European level
Constanța			
Institution	Research infrastructure	Publications	Patents

"Ovidius" University of Constanța	The university has 6 laboratories, focused on various fields of interest, such as: photovoltaics, nanomaterials, molecular biology, virtual reality, etc. There are also the following centers: Research Center of the Faculty of Natural Sciences and Agriculture; Experimental Research Center of the Faculty of Medicine; Interdisciplinary spa research center;	The university publishes scientific annals on various fields of research, such as: political science, economics, mechanical engineering	According to EPO, "Ovidius" University of Constanța has registered at European level a number of 4 patents.
Maritime University of Constanța	The university has 7 research centers, in fields such as: naval engineering, nuclear physics, electrical and mechanical engineering, cyber security, robotics, etc.	The Maritime University of Constanța publishes annually the scientific Annals of the university. The most recent is volume 27 no. 223, published in 2019. The publication presents various results of scientific research conducted by the University, in areas such as navigation and maritime transport, mechanical engineering, maritime economics, cyber security.	According to EPO, the Maritime University of Constanța does not have any patent registered at European level.
Murfatlar Viticulture and Vinification Research and Development Station	The institute has the following technological infrastructure:	Directly or under the coordination of ICDVV Valea Călugărească have been tested in the last 20 years, over 75 phytosanitary products to combat diseases and pests of	According to EPO data, the Resort has a number of 12 patents registered at European level, mainly regarding the

	Grape processing technologies and wine chemistry Breeding and viticulture technologies	vines (domestic and imported), establishing their effectiveness, optimal application rates, compatibility with other control products. The results obtained were capitalized in the form of recommendations to all wine-growing units in the country and to small private producers. A basic concern of the laboratory was the annual monitoring of the phytosanitary condition in the Murfatlar vineyard (approximately 7,000 ha) and the elaboration of forecast and warning bulletins to combat vine diseases and pests.	grape species "COLUMNA" and "MAMAIA".
"Grigore Antipa" National Marine Research-Development Institute	The institute has: A hydroacoustic laboratory Center of Competence in Space Technologies Constanța	The journal "MARINE RESEARCH" has been publishing since 1971 studies on issues related to oceanography, marine engineering, marine biology, living marine resources and environmental protection. The last publication is volume 49, from 2019.	According to EPO data, the National Institute for Marine Research and Development "Grigore Antipa" does not have any patent registered at European level.
"Mircea cel Batran" Naval Academy Constanta	The academy has two centers: Marine Interdisciplinary Research Center Navigation and Naval Management Interdisciplinary Research Center	Annually, the university publishes the "Scientific Bulletin of the Naval Academy". Starting with 2018, it is published in four distinct series: A: Mechanical engineering B: Electrical engineering, automation and computer science	The "Mircea cel Batran" Naval Academy has, according to the European Patent Office, a patent registered at European level.

Institution	Research infrastructure	Publications	Patents
		C: Navigation, transport and management D: Fundamental and applied research in the military, linguistic and social sciences	
Constanța Fruit Research and Development Station	The resort has two laboratories: Genetics and reproduction laboratory Laboratory of orchard technologies and plant protection	Scientific papers indexed Web of Science (ISI Reuters): 12 Indexed BDI, CNCSIS, etc. : 700 Books and book chapters: 31 + 38 Volumes of scientific papers: 5 Popular brochures and leaflets: 225	According to the institution's report, the following patents have been registered: 2013 - For the apricot species, two varieties: "ELMAR" and "OVIDIUS"; 2014 - For the peach species, three varieties, pavii: "IUSTIN", "MIMI" and "MINODORA"
Galați			
Institution	**Research infrastructure**	**Publications**	**Patents**
Research and development institute for aquatic ecology, fishing and aquaculture Galati	The institute has various laboratories, such as: Aquatic ecology laboratory Laboratory for quality and safety fishery products "PESCALIS" Laboratory for aquaculture and fishing systems Laboratory for ecology, evaluation, conservation of aquatic organisms	The institute has developed various projects of interest for the field of aquaculture, such as the project "Development of recirculating systems, support for diversification of fish production".	According to EPO, the Research and Development Institute for Aquatic Ecology, Fisheries and Aquaculture, Galati, has registered two patents at European level.

"Dunărea de Jos" University of Galați	Scientific research center on machines, thermal equipment and environmental engineering in energy - METIME	In the period 2010-2020, "Dunărea de Jos" University of Galati carried out applied research projects together with 6 international beneficiaries, from Member States such as Belgium, the Netherlands, France, etc.	Between 2008 and 2019, the "Dunărea de Jos" University of Galați was listed in the database of the State Office for Inventions and Trademarks (OSIM) with a number of 37 patents obtained.
	Romanian Center for Modeling Recirculating Systems in Aquaculture	Also, in the period 2013-2020, the University participated in no less than 155 research projects in partnerships with national agents, in fields such as Food Science and Engineering, Naval Architecture, Medicine and Pharmacy, etc.	
	Integrated Center for Research, Expertise and Technology Transfer in the Food Industry (Bioaliment-TehnIA)		
	European Center of Excellence for the Environment - ECEE		
	Center for Advanced Welding Research - SUDAV		
	Research and development center for thermo-matrix composites		
	Center of Excellence Polymer Processing		
	Materials and quality of the environment - CMM		
	INPOLDE - Infrastructure for interdisciplinary environmental research in the Lower Danube Euroregion		
	Research center for mechanics of machines and technological equipment - MECMET		

Brăila			
Institution	Research infrastructure	Publications	Patents
Ceprohart S.A..	The company has a number of laboratories, such as: Physical-mechanical testing laboratory for pulp, paper and cardboard; Laboratory for the preparation of fibrous pastes and dosing of chemical additives; Physico-chemical analysis laboratory;	Ceprohart projects and publications include: "Active graphene-based food packaging systems for a modern society" - GRAFOOD "Polymeric biocomposites from renewable resources for cutting-edge applications" - CEEX NANO "Paper for security printing with magnetic properties" - HARTDETECT	According to the European Patent Office, Ceprohart S.A. has registered 12 patents at European level

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Research and development network

The table below summarizes the fields / directions of research and development of the most relevant actors in the South-East Region, as well as the services offered by them:

Table no. 29. Innovation research areas / directions of key actors at the level of the South-East Region

Institute/University/Company	R&D areas / directions
"Danube Delta" National Research and Development Institute - INCDDD Tulcea	Main research areas: • the structure, evolution and functioning of specific ecosystems for wetlands; • monitoring of biodiversity and environmental factors; • modeling the basic processes in the functioning of ecosystems; • sustainable use of natural biological resources (fish, plants, hunting and landscapes); • evaluation and reduction of anthropogenic impact; • renaturalization and restoration of ecologically deviated ecosystems through inadequate anthropogenic interventions; • ecological reconstruction; • ecological recovery of populations of declining species;

Institute/University/Company	R&D areas / directions
	• harmonization of economic and social interests with the objectives of conservation of biological diversity; • development of the Geographic Information System and the use of remote sensing techniques; • strategies for biodiversity conservation and sustainable use of natural resources; • management plans for the management of wetlands and aquatic resources; • elaboration of thematic maps, atlases and monographs; • scientific substantiation of the draft normative acts that regulate the environmental protection; • specific research and studies for the implementation of international conventions on environmental issues to which Romania has acceded; • consultancy for the harmonization of the internal legislation with that of the European Union in the field of environment. Secondary research areas: • physico-chemical laboratory analyzes (water, soils, food products), hydrobiological; • participation in the technological transfer: • the results obtained in the research-development activity, namely: annual reports, strategies, management plans, recommendations, publications, databases, solutions, thematic maps, which will be used according to the legal provisions by the central and local public authorities, the scientific community, non-governmental organizations and economic operators in the field of environmental protection; • organizing scientific sessions and training courses in the field of environmental protection; • implementation of specific aquaculture, agriculture and forestry technologies in the pilot station. Services / microproduction: ➢ studies and projects for the execution of ecological reconstruction works and the improvement of environmental conditions;

Institute/University/Company	R&D areas / directions
	- feasibility studies and technical projects for fisheries, hydrotechnical constructions; - technical assistance for the design and execution of investment objectives; - cadastral, geodesy and cartography works - topographic, geotechnical, hydrological studies to substantiate investment projects - the execution of unique and small series, within the microproduction activity, the production and delivery of biological material for the repopulation of natural ecosystems, as well as in culture systems;
"Grigore Antipa" National Marine Research-Development Institute Constanța	Main research areas: - General oceanography, operational oceanography, - Marine and coastal engineering, - Environmental Engineering, - Marine ecology and biology, - Management of living resources in the Black Sea, - Environmental impact assessment. Secondary research areas: - Training and professional specialization activities, - Activities of editing and printing of specialized publications, - Technology transfer activities of research results, - Capitalizing on the results of marine and coastal research. Services / microproduction: - Provision of services or production activities in the field of its own field of activity, in cooperation with collaborating institutions to support technology transfer, capitalization of research, participation in exhibition activities, all in accordance with applicable law.
National Research and Development Institute for Marine Geology and Geoecology - GeoEcoMar	Main areas of research and development: Complex knowledge of the Danube macro-geo-system - Danube Delta - Black Sea (evolution and geological structure, marine resources, specialized expertise);

Institute/University/Company	R&D areas / directions
	• elaboration of geological - sedimentological and marine geophysical maps (single- and multibeam bathymetry, seismic-acoustic, gravimetry and marine magnetometry); • Knowledge of the structure and functioning of ecosystems in the Danube macro-geo-system - Danube Delta - Black Sea; • Studies and research for the integrated management of the coastal area; - Study of global changes (sea level, climate) and knowledge of their effects on the environment; • Study and monitoring of natural hazards in the marine field - National Monitoring Center - Alarm to Marine Natural Hazards EUXINUS; • Introduction of modern research techniques and technologies; • Elaboration of strategies, studies, forecasts regarding the development of the science field and of the branch / sector of activity; • Studies on CO_2 storage in underground geological structures; • Participation in international programs. Secondary research areas: • Participation in the implementation of sectoral plans and core programs; • Carrying out studies on strategic areas and national defense; • Technical assistance provided to state bodies. Services / microproduction: • Impact studies and environmental assessments; • Professional training and specialization; • Organization of scientific events (eg summer schools, courses and seminars for education / popularization of geosciences, organization of thematic excursions); • Consultancy and specialized assistance; • Editing and printing publications specific to the field of activity (geological guides, maps, books, brochures, etc.); • Provision of services (laboratory analysis, specific measurements, mapping, guidance, etc.); • Participation in the technological transfer.

Institute/University/Company	R&D areas / directions
Buzau vegetable research and development station	- Conservative selection and production of biological material for vegetable and flower varieties - Agrochemistry - Physiology - Biochemistry - Optimization of crop technologies for open field crops and protected areas - Plant protection - Floriculture - For the dissemination of the results of scientific research carried out within the sector of - More efficient research and promotion in production of these results was established and - Activates within the S.C.D.L. Buzau a Regional Horticulture Consulting Center.
Research and development station for viticulture and vinification - Bujoru	The research activity carried out within the laboratories of SCDVV Bujoru explores plant and soil agrotechnics, including: - plant protection; - anti-erosion agrotechnics and watering techniques; - genetics and breeding; - viticultural planting material; - vinification, chemistry and microbiology of wine.
Research and Development Institute for Sheep and Goat Breeding I.C.D.C.O.C. Palas Constanța	- fundamental, applied research, technological development and movement in the field of sheep and goat breeding; - creation of new breeds and specialized populations; - production and multiplication of purebred animals with high zootechnical value, innovative technologies for breeding, exploitation and nutrition depending on the pedoclimatic area, the direction of exploitation and the size of farms; - biotechnologies for reproduction and conservation of sheep and goats.
Murfatlar research and development station for viticulture and vinification	In the research sector, 15 researchers and laboratory workers work, with the following laboratories: - Improvement and planting material; - Technologies in viticulture; - Plant health protection;

Institute/University/Company	R&D areas / directions
	• Grape processing technologies and wine chemistry.
Constanţa research and development station for fruit growing	Main research areas: • Agriculture, • Forestry, • Food services. Services: • Capitalizing on fruits, • Planting material, • Consulting, • Preparation and approval of projects for the establishment and operation of orchards.
Research and development institute for aquatic ecology, fishing and aquaculture Galati	Main research areas: • Agriculture, • Forestry, • Food services.
"Gavrilă Simion" Eco-Museum Research Institute Tulcea	Main research areas: • archeology-history, • natural Sciences, • ethnography, • the art.
Military Unit 02133 - Maritime Hydrographic Directorate	Directions for research and development: • development of multidisciplinary scientific research of the national maritime area of competence; • participation in scientific research in national and international waters in the field of hydrography, oceanography and topogeodesy; • development of multidisciplinary scientific research of the exclusive coastal and economic areas of Romania; • development of scientific research in the field of marine meteorology in the western Black Sea basin; • development of scientific research in the field of classical and electronic nautical cartography.

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Institute/University/Company	R&D areas / directions
"Ovidius" University of Constanța	The centers through which the research-development activity is carried out: • Research-Development Center for Morphological and Genetic Study in Malignant Pathology (CEDMOG) -investigation of malignant tumors; • Institute for Nanotechnologies and Alternative Energy Sources (INSAE) • Center for Black Sea Security Studies (CSS-MN) - the field of security in all its aspects (political, economic, societal, ecological, military, etc.), in the Black Sea region and beyond. • Center for Economic Development and Black Sea Cooperation (CDEC-MN) - the field of economic, social and cultural development and international collaboration to strengthen democratic values and regional stability. • Center for Non-Proliferation and Disarmament (CND) - the field of non-proliferation of weapons of mass destruction, disarmament and control of conventional weapons.
Maritime University of Constanța	Main research areas: • Naval transport • Industrial electromechanics
"Dunărea de Jos" University of Galați	The research directions approached converge from the research strategy of the university which mainly aims at: • increasing the role of science in society; • increasing the contribution to the progress of frontier knowledge; • increasing competitiveness through innovation; • development of high-performance research units; • increasing the visibility of research groups; • concentrating resources and directing research in areas that can contribute to regional development and ensure competitiveness and added value globally.
"Mircea cel Bătrân" Naval Academy from Constanța	Priority research directions: • Sustainable development in the shipbuilding industry; • Management applications in shipping and port operation;

Institute/University/Company	R&D areas / directions
	• Techniques and technologies for the development of maritime and river transport; • Fundamental sciences applied in the naval industry; • Interdisciplinary projects in the shipbuilding industry. • Innovative processes and products in electrical engineering with application in the naval industry; • Thermal machines, propulsion installations, auxiliary on-board installations • Modeling and simulation of processes in the shipbuilding industry • Naval armament.
"Danubius" University of Galati	Research programs are carried out through: Research Center on Socio-Economic Dynamics in Sustainable Development (DiSEDD): • fundamental and applied research on economic and social development, competitiveness and innovation, social and environmental impact and resources of economic and social development, research mainly focused on the study and modeling of the evolution over time of phenomena specific to these fields; • modeling the economic and social phenomena for the short, medium and long term forecast of their evolution, as well as of the economic, social and environmental impact that they can cause; • analyzes and studies on information systems and the efficiency of information systems in companies, administration, education and research, as means of computational modeling and control; campaigns for the use of information systems in management and administration and prediction in sustainable development. "Theoretical and Applied Economics" Research Center: • the field of theoretical and applied economics, as well as the development of applied research programs either independent or connected with other scientific branches.
"Andrei Şaguna" University of Constanța	Research programs are carried out through:

Institute/University/Company	R&D areas / directions
	- "Andrei Şaguna" IT and Communications Center - field of banking financial information systems, software for budgetary institutions and public administration, applied research in the field of accounting, audit and management informatics, studies and projects on the application of mathematical modeling in forecasting and planning; - Center for socio-human studies and surveys - in the field of public opinion behavior, media effects assessment, electoral studies, research on political communication; - Center for applied psychology, accredited center - intellectual potential, compatibility of skills, psychological profile with profession and job, assessment of managerial skills, determination of relationship indices, anxiety, depression, employment testing, driving license testing, etc.
University of Agronomic Sciences and Veterinary Medicine in Bucharest	Research programs are carried out through: • Sustainable Agriculture Research Center: • Research center for the study of the quality of agri-food products-HORTINVEST and Greenhouse-block for research, automated unit and with self-control functions • Integrated Fruit Growing Research Center • Interdisciplinary Laboratory for the Study and Modeling of Heavy Metal Accumulation in the Trophic Chain • Institute of Comparative Medicine • University Research Center for Diagnosis and Therapy of Animal Diseases • Interdisciplinary Laboratory for the Study and Modeling of Heavy Metal Accumulation in the Food Chain • Romanian-Italian Center for Comparative Oncology • Reproductive biotechnology laboratory • Research laboratory in Parasitology • FIFIM Research Center-Rural Engineering and Environmental Protection • BIOTEHGEN Microbial Biotechnology Center • Center for Applied Biochemistry and Biotechnology BIOTEHNOL • Research Center in the Field of Management, Economic Engineering in Agriculture and Rural Development

Institute/University/Company	R&D areas / directions
CEPROHART S.A.	- Fundamental and applied research in the field of pulp, paper, cardboard and related fields; - Elaboration of works at the laboratory, pilot and industrial phase for: - special tests for optimizing the parameters in various technological phases of the manufacturing process - identification of sources of alternative fibrous raw materials; - assimilation of new assortments of special papers and cardboards; - chemicalization of paper and cardboard manufacturing processes; - technical expertise and consulting in characterizing different types of paper and cardboard; - Consultancy in establishing the conformity of some products with the technical specifications and functional requirements of the products - Expertise in the development of innovative products in the field of secure stationery products designed to combat the theft, duplication or destruction of documents containing highly confidential information, in areas such as: research and development, pharmaceutical industry, aerospace, electronics, classified information management , military field, etc. - Expertise in identifying customized solutions for the development of secure stationery products to combat counterfeiting of high value products or forgery of special documents.
ROMÂNIA-EUROEST SA	The company Romania Euroest SA designed, made, approved, patented OSIM, CE-NNTR certificate (conformity assessment by AFER), put into operation and handed over in operation in recent years, 12 modernized locomotives, obtained by transforming old diesel-hydraulic locomotives 1,250 hp.

"Ovidius" University of Constanța plays an important role in the field of research and development, implementing projects with various partners in fields relevant to the region and its potential for smart specialization. In order to fulfill its university mission of preparing the workforce for market requirements, the University has implemented and continues to implement numerous projects for the training of young people and facilitating access to the labor market. Some of them have a transnational

character, the University having a wide range of international partners with whom it has carried out joint actions and activities over time. Other important transnational projects aimed at the balanced development of Danube ports and cooperation in the field of maritime spatial planning. The university has also carried out projects dedicated to the agricultural field, both for the final beneficiaries of rural development programs and for other larger actors in the field. There were also projects that supported research for high value-added products[21]. The university has implemented projects with European partners such as: Padagogische Hochschule Wien, European Marine Equipment Council, Asociacion Espanola de Criadores de la Cabra Murciana Granadina, Instituto de Soldadura e Qualidade, Norwegian Institute for Water Research (NIVA), numerous partners from Bulgaria, such as Dobrich Chamber of Commerce and Industry, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences, Technical University of Varna; among the transcontinental partners can be mentioned: Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Korea Institute of Science and Technology, Council of Scientific and Industrial Research (India), National Institute of Metrology, Standardization and Industrial Quality - INMETRO. It is noted that the University has an important network of partners, the states that were often on their list of collaborations being Bulgaria, Croatia, France, Italy, Germany, the Netherlands, Portugal, Slovakia and Hungary.

The "Dunărea de Jos" University of Galați is also a nucleus for the research-development activity in the region. Through its projects with various partners, the University manages to achieve important results, thus participating in research activities, the creation of new high quality products, the evaluation of the effects of climate change and the production of methods and of computer products. The multidisciplinary capacity that the University has managed to develop over time, influences the areas in which it manages to implement projects, so that the important results it has achieved have been in the fields: information technology, environment, agriculture, security and food security, energy, biotechnology. Among the University's partners can be mentioned: Faculty of Technological Equipment, Technical University of Constructions from Bucharest, Joint Institute for Nuclear Research, Zeeland, Romanian Association of Tensiometry, Dyadic Netherlands, International Association for Applied Mathematics and Mechanincs, Technical University "Gheorghe Asachi" from Iași, Agri-food & Biosciences Institute and others[22].

The National Research and Development Institute "Danube Delta" - INCDDD Tulcea participates in various projects, fulfilling its mission as a multidisciplinary entity and leading to the development of solutions for local problems. Given the protected area status of the Danube Delta, the Institute is

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[21] According to the information on the website of the Department of Management of European Funds of the "Ovidius" University of Constanța, last accessed October 2020, http://dpfe.univ-ovidius.ro/
[22] According to the information available on the official website of the University, last accessed October 2020, https://www.ugal.ro/cercetare

developing partnerships that take into account the sustainability of processes and technologies related to human activities. Thus, the institute has international partnerships for evaluating resources and solutions in order to facilitate the sustainable development of the area. One of the important programs, in progress, is the "Danube Delta 2022" CORE PROGRAM, this being a complex one that aims to support the development plan of the Institute. The main activities aim at assessing the conservation status of biodiversity and habitats, but also the modeling and design of natural systemic solutions to limit risk factors in integrated spatial planning. Finally, the program aims at the sustainable development of human communities and information management in biodiversity research, ecological restoration[23].

The National Research-Development Institute for Marine Research "Grigore Antipa" - INCDM Constanța, like the one presented above, assumes the mission of sustaining the activities in the area. Among the fields in which the Institute carries out activities can be mentioned agriculture, fish farming, history and archeology. These projects are carried out both internationally, through partners who are often from countries with access to the Black Sea or other seas, and at national level, through European or national funds. The Institute also implements projects to improve the administrative capacity of the entities involved in the management and implementation of sectoral and regional strategies. Thus, in addition to research and development activities, the Institute prepares human resources to achieve a high level of efficiency in integrated coastal zone management[24].

The National Research-Development Institute for Marine Geology and Geoecology - GeoEcoMar develops projects together with international and national partners, depending on the field of interest and objectives. Thus, for complex marine management projects, the Institute joins the states facing similar problems (the states around the Black Sea, the Caspian Sea, etc.), and for evaluation studies and for the development of strategies and the development of monitoring technologies. The institute carries out national projects together with internal actors. The multidisciplinary character of this institute is very well represented by the diversity of projects, it manages to conduct numerous research projects in adjacent fields. Important international partners are the Institut français de recherche pour l'exploitation de la mer (IFREMER) or the Avalon Institute of Applied Science (Canada), and among the national ones we can mention the Romanian Presidency, the National Agency for Scientific Research and Innovation, the National Research Institute - Development for Environmental Protection ICIM Bucharest, National Research and Marine Development Institute "Grigore Antipa" - Constanta etc. The two headquarters of the Institute allow a greater openness compared to the other two research and

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[23] According to the information available on the official website of the Institute, last accessed October 2020, http://ddni.ro/wps/ro/acasa/#close
[24] According to the information available on the official website of the Institute, last accessed October 2020, http://www.rmri.ro/Home/Programmes.html

development entities presented above. Its visibility is much higher, allowing it to attract both important partners and specialized human resources[25].

Furthermore, the Research-Development Institute for Aquatic Ecology, Fisheries and Aquaculture Galati (ICDEAPA Galati) is a key player in research in the South-East Region, and among its partners are institutions such as the University "Lower Danube" in Galati. The fields of activity of the institute are related to aquaculture research, micro-productions, fundamental and applied research, technological transfer of research, as well as fish farming and ancillary services.

The Research-Development Institute for Sheep and Goat Breeding Palas Constanța (ICDCOC- Palas) coordinates at national level the research activity in the field of sheep and goat breeding collaborating with other research stations in Bacău, Caransebeș, Botoșani, etc., but also with Universities of Agronomic Sciences and Veterinary Medicine in Bucharest, Iasi, Timisoara and Cluj-Napoca.

The research activity of the institute is carried out within four main fields, namely:

- Genetics and breeding;
- Reproduction;
- Nutrition and breeding and exploitation technologies for sheep.

The relationship between GDP/inhabitant and expenditures on research and development

Gross domestic product (GDP) is a key indicator of economic development and growth. GDP and household income are first calculated in national currency, then converted to purchasing power parity (PPP), which takes into account price differences between Member States, allowing for a more accurate comparison. The use of PPCs (instead of market exchange rates) allows these indicators to be transformed into a common virtual currency called the purchasing power standard (SPC). The use of SPCs makes it possible to compare purchasing power in all Regions of Member States that use different currencies and where the price level is different.

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[25] According to the information available on the official website of the Institute, last accessed October 2020, https://www.geoecomar.ro/website/proiecte.html

Figure no. 93. Evolution of PIB/Capita at regional level, Romania and EU28, 2010-2018, Euro
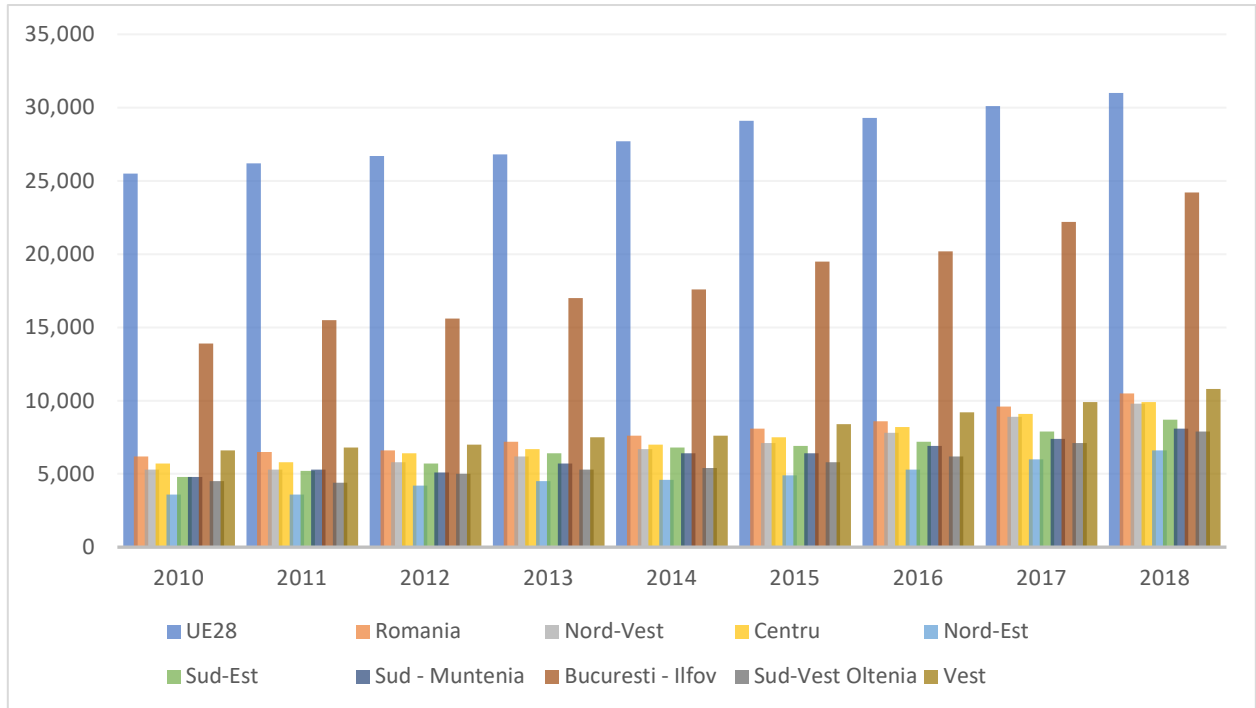
Source: Data processing - EUROSTAT, 2020

As can be seen from the figure above, in the South-East Region the trend of the indicator is increasing, but below the national and European Union average. GDP / inhabitant increased from 4,800 euros per inhabitant in 2010 to 8,700 euros per inhabitant in 2018. If in 2010 the GDP / inhabitant of the South-East Region was 5.3 times lower than the European average, in 2018 it was only 3.5 times lower than the EU average.

The indicator expressed in PPS is even more suggestive. At the level of 2010, the standard of purchasing power of GDP per capita in percentages of the EU average, for the South-East Region, was 39%, increasing up to 54% in 2018.

Figure no. 94. Purchasing Power Standard (PPP) of GDP per capita as a percentage of the EU average for 2010-2018
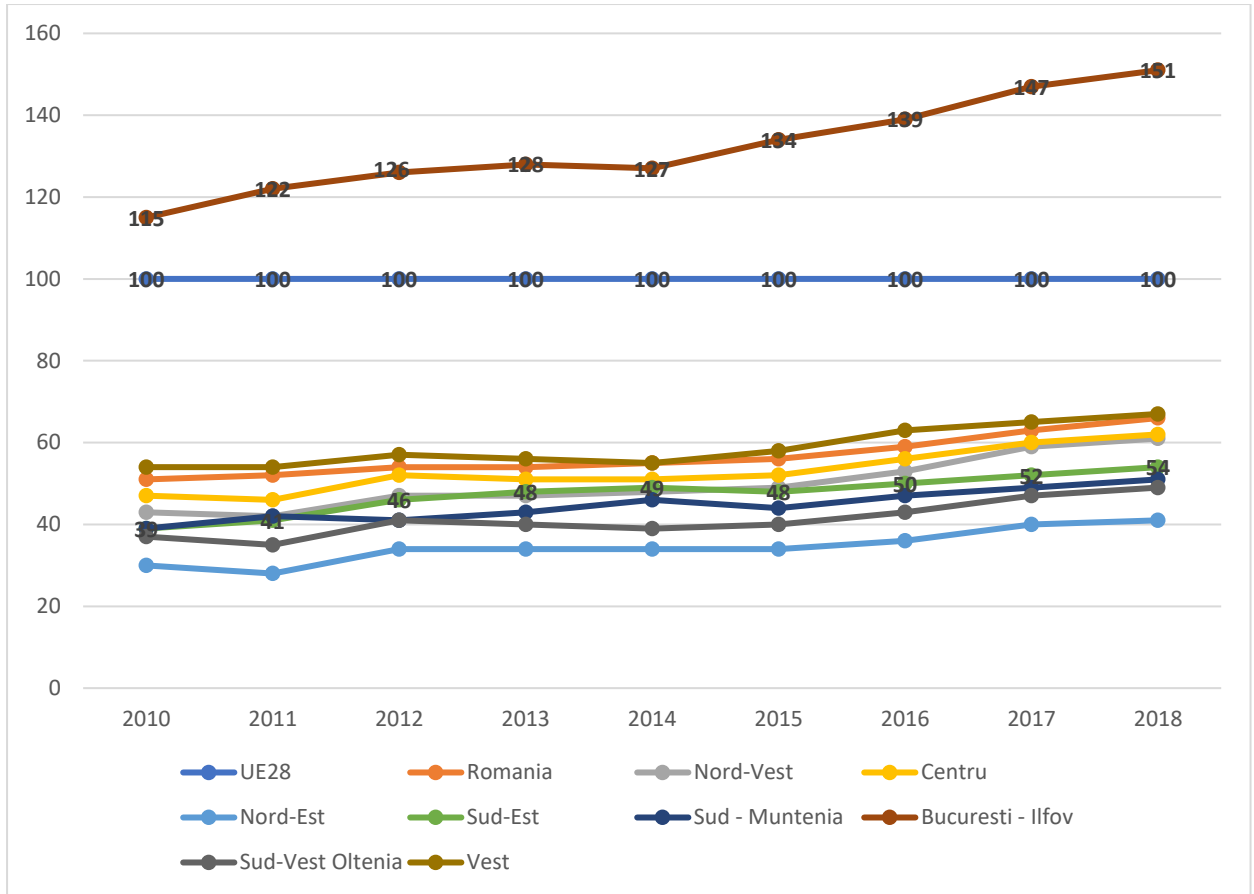
Source: Data processing - EUROSTAT, 2020

Also, the analysis of aggregate data at county level reveals an interesting situation. Although the vast majority of counties in the South-East Region are below the national level in terms of GDP / inhabitant, Constanța County is not only at a higher level than the national average, but this trend is maintained from one year to another. Thus, if in 2010, the GDP / inhabitant of Constanța county was 6,900 euros, at the level of 2017 it was 11,800 euros. The last place is occupied by Vrancea County, with a GDP / inhabitant of 5,700 euros in 2017, below half the level registered by Constanța County.

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Figure no. 95. Evolution of GDP / county inhabitant, Romania, 2010-2017, Euro
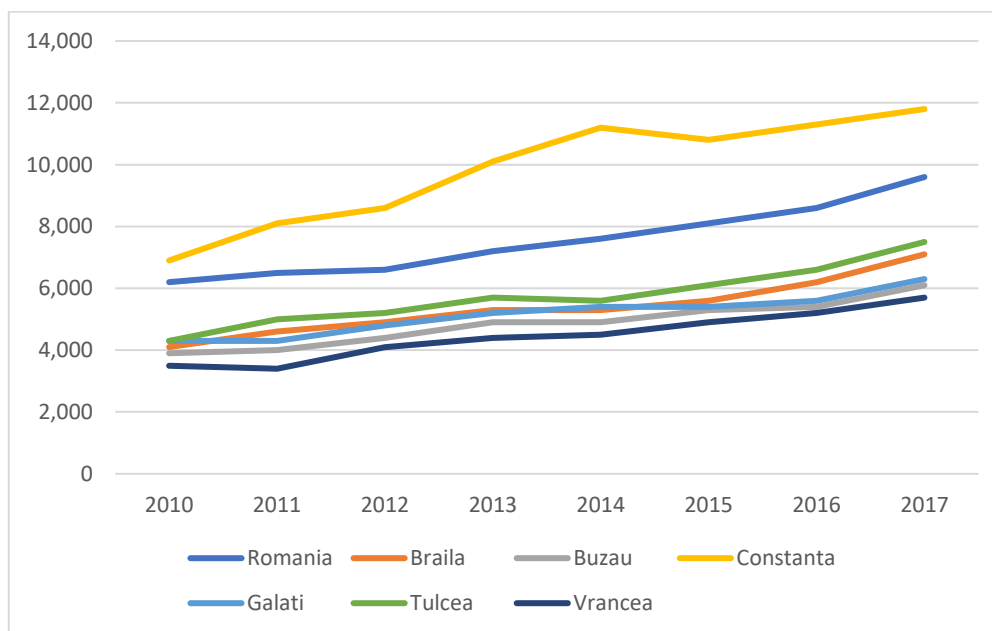
Source: Data processing - EUROSTAT, 2020

In order to model the link between GDP / inhabitant and research expenditures, the following econometric model was developed:

GDP per capita = β0 + β1 Expenditures on research development as% of GDP + ε

The following database was further constructed on the basis of Eurostat information:

Table no. 17. GDP / capita and research and development expenditures at national level in the period 2002-2018

Year	GDP/Capita	R&D expenditures as % of GDP
2002	2,250	0.38
2003	2,370	0.40
2004	2,820	0.39
2005	3,720	0.41
2006	4,590	0.46
2007	6,110	0.51
2008	7,140	0.55
2009	6,150	0.44
2010	6,200	0.46
2011	6,540	0.50
2012	6,620	0.48
2013	7,190	0.39

Year	GDP/Capita	R&D expenditures as % of GDP
2014	7,570	0.38
2015	8,080	0.49
2016	8,630	0.48
2017	9,580	0.50
2018	10.500	0.50

Source: Data processing - EUROSTAT, 2020

The linear link between the two indicators can be viewed in the scatter plot chart below:

Figure no. 96. Scatter plot GDP / capita and R&D expenditures as % of of GDP

$y = 23446x - 4267.7$
$R^2 = 0.2843$
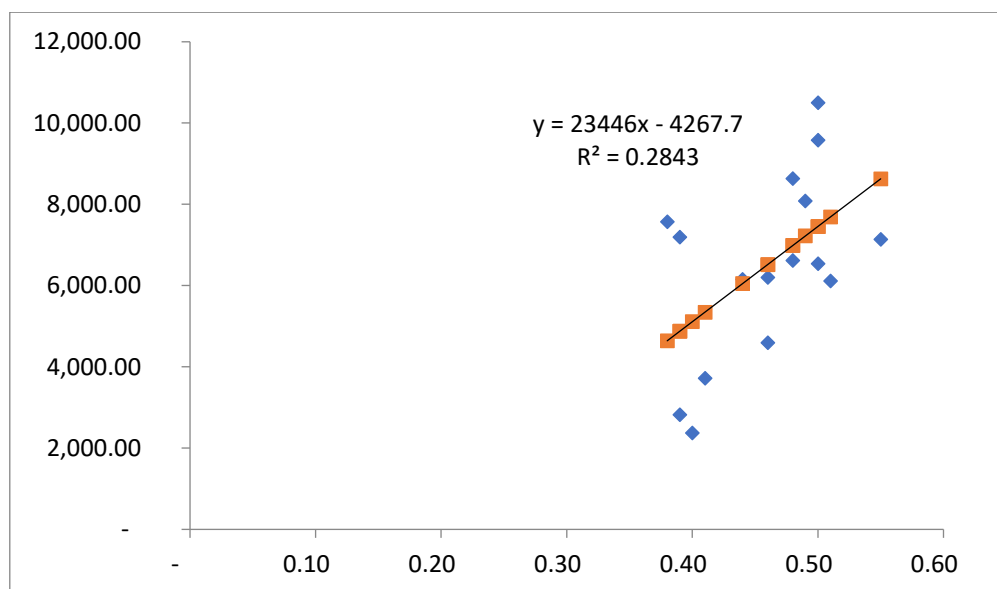
Source: Data processing - EUROSTAT, 2020

A direct and strong linear connection was observed. Applying the analysis of simple linear regression, the following results are obtained:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.533208588
R Square	0.284311399
Adjusted R Square	0.233190784
Standard Error	1982.776441
Observations	16

ANOVA

	df	SS	MS	F	Significance F
Regression	1	21864809.97	21864809.97	5.561580237	0.033430126
Residual	14	55039633.78	3931402.413		
Total	15	76904443.75			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-4267.702703	4587.697048	-0.93024946	0.368005721	-14107.33426	5571.928855	-14107.33426	5571.928855
R&D Exp	23445.94595	9941.883181	2.358300286	0.033430126	2122.727246	44769.16465	2122.727246	44769.16465

Thus, the regression model can be written as follows:

GDP per capita = -4,267.70 + 23,445.94 * Expenditure on research and development as % of GDP

The term free is not statistically significant. However, the regression slope coefficient is statistically significant for the 95% confidence level. This means that there are serious statistical arguments that indicate that an increase in research and development spending can lead to an average increase in GDP/capita. Therefore, it can be concluded that investments in research and development activities can positively influence the well-being of citizens by increasing the national/regional economy.

The coefficient of determination of the model is 28.43%, which means that, according to this model, the variation of GDP/capita can be explained in proportion of 28.43% of research and development expenditures and the rest, up to 100%, is attributable to other factors.

Index for competitive potential

The competitiveness is a complex concept, with multiple approaches in economic literature and practice, essential for measuring the level of development of a country and fundamental for the well-being of a nation.

The World Economic Forum, a body that measures the competitiveness of the world's countries since 1979, defines the concept as: "The set of institutions, policies and factors that determine the level of productivity of a country" (World Economic Forum, 2019).

In other working documents, the OCDE states: "Competitiveness is the degree to which, under a free market, a nation can produce goods and services that can pass international competitive tests and, at the same time, can be mentioned and increase revenue real internal".

Competitiveness, a dominant factor in supporting economic growth and reducing gaps in the context of convergence processes, is measured by a large number of indicators, which take into account economic performance, degree of internationalization, capital (level and structure), level of education, labor productivity, labor compensation and unit labor costs, the cost of non-profit enterprises, taxes, science and technology, computerization and digitization of society, transport and transport infrastructure, environmental protection and management.

Globally, the best known indicator for measuring global competitiveness is the Global Competitiveness Index, developed and applied by the World Economic Forum. The latest WEF report is the Global Competitiveness Report 2019, conducted using the Global Competitiveness Index 4.0, based on the interview of 15,000 company executives from 141 countries. GCI 4.0 is the result of the aggregation of 103 individual indicators, divided into 12 "pillars": Institutions, Infrastructure, IT&C Implementation, Macroeconomic Stability, Health, Skills, Product Market, Labor, Financial System, Market Size, Business Dynamics and Innovation Capacity.

RCG 2019 indicates Singapore as the most competitive country globally, in last place, 141, with the Republic of Chad, in central Africa. By geographical regions, RCG 2019 indicates East Asia and the Pacific region as the most competitive in the world, followed by Europe and North America. Compared to this competitiveness indicator, Romania is on the 51st place in the world, compared to the previous report, maintaining its position in the international ranking. The Romanian Chamber of Commerce and Industry (CCIR) points out that, in terms of business dynamics, one of the chapters that make up the GCI 4.0 global competitiveness index, Romania scored points on the attitude of companies towards investment risk, as well as the rate insolvency recovery. Also, compared to 2018, there was an increase in the turnover of innovative companies operating in Romania. As in the previous year, the index regarding the costs related to starting a business remained the same, instead Romania lost points in the ranking regarding the time needed to start a new business.

Figura nr. 97. Indexul competitivității globale 2019, România
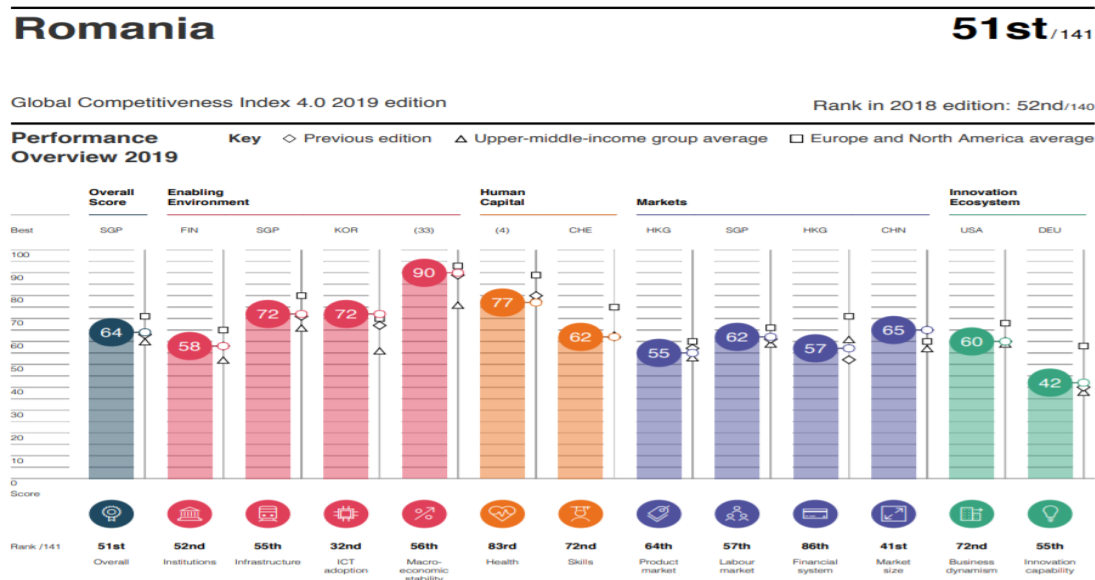
Sursa: World Economic Forum, Global Competitiveness Report, 2019

At the European level, the European Commission measures the competitiveness of all NUTS -2 regions in the Member States of the European Union, using the Regional Competitiveness Index (RCI). This index calculates, based on over 70 comparable indicators, the ability of a region to provide an attractive and sustainable environment, both for the business environment / companies and for residents. The calculation methodology starts from the premise that, in a spatial context, economic competitiveness is determined by a complex system of factors, which concentrates, among others: creative and innovative capitalization of regional potential, making connections at territorial level by stimulating the emergence and strengthening of ties. enter and inter-industrial value chains, capitalize on natural and cultural heritage, use the potential of research and innovation and improve connectivity and accessibility.

The results of RCI 2019 are illustrated on the European Commission's website with the help of an interactive map and other web tools that allow comparisons by region of competitiveness indicators such as: governance, infrastructure, digital networks, health, human capital and the labor market and innovation. The tool is also designed to help regions identify their strengths, weaknesses and investment priorities when elaborating their development strategies. Regional competitiveness is illustrated using a scale from 0 to 100, for each indicator.

Analyzing the interactive map and the components of the index it can concluded that Romania is among the least competitive countries in Europe, a level comparable only to a number of regions in Bulgaria,

Greece, Italy and Spain. Excepting the Bucharest Ilfov Region (RCI = -0.10), all other regions in the country have a strong negative index, below -1 (see Figure no. 117).

Also, according to this competitiveness indicator, on a scale from 0 to 100, Romania registers only 17.84 points, only the Bucharest-Ilfov Region having a score above average (55.92 points). At the opposite pole is the South-East Region, with only 5.35 points (Figure no. 116).

Figure 116 Map of the European Regional Competitiveness Index (RCI)
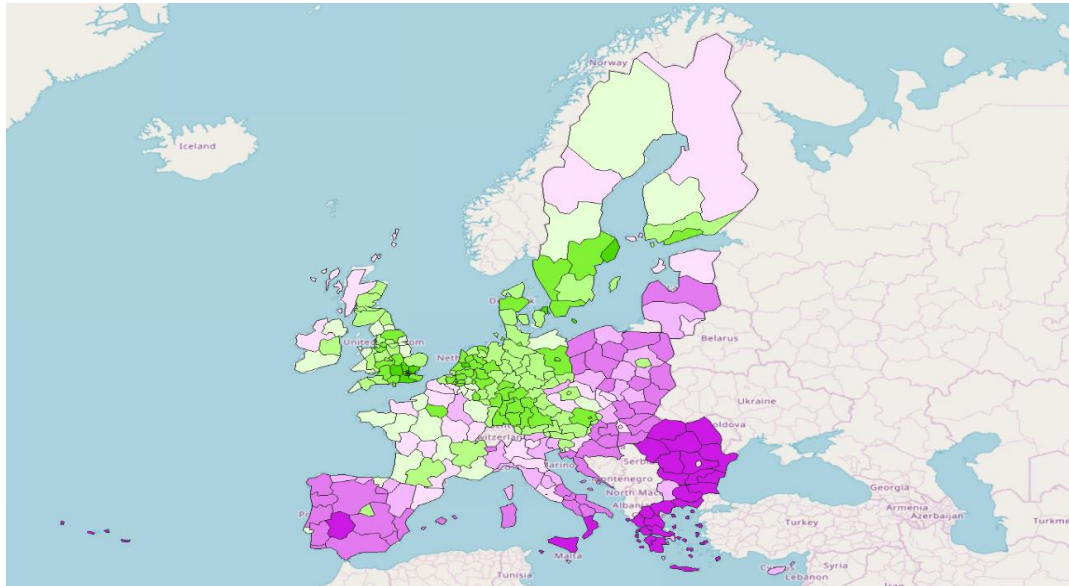
Explanatory note: Index values are represented by shades of color ranging from dark green for high values (> 1) to dark purple for low values (<-1).

Source: European Commission, 2019

Figure 117. European Regional Competitiveness Index (RCI) by country and component
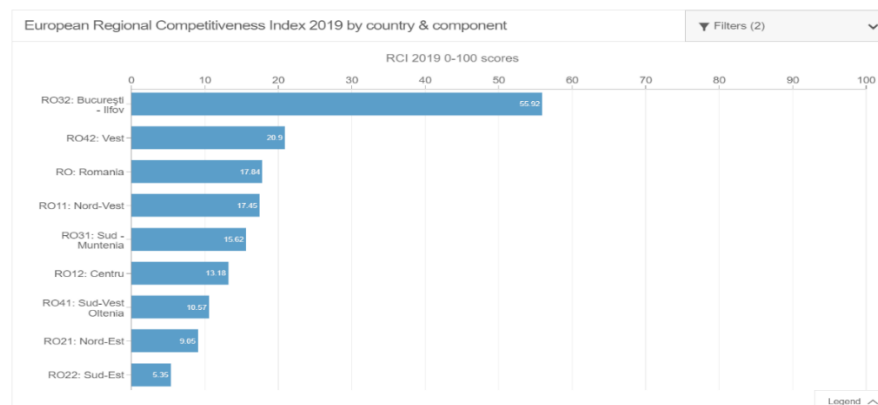
Source: European Commission, 2019

An important aspect is that, analyzing the evolution over time of the indicator, we notice that in the period 2010 - 2019, Romania is on a slightly positive trend, due especially to the Bucharest-Ilfov Region, West Region, North-West Region and South-Muntenia Region. The South-East region, although it has not undergone significant changes, the trend of the last 10 years is a slightly negative one, from an RCI 2010 of -1.38 to RCI 2019 of -1.46.

Figure 118. European Regional Competitiveness Index (RCI) at the level of Romania, 2010 - 2019
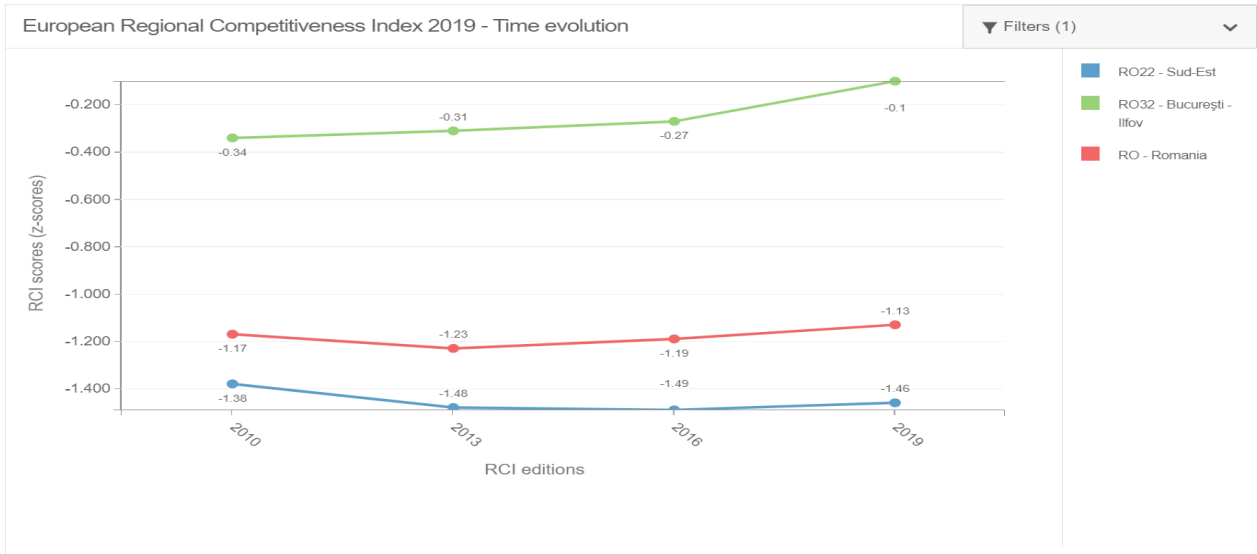
Source: European Commission, 2019

Figure 119. European Regional Competitiveness Index (RCI) by components at EU level (blue), Romania (red) and South East Region (green)

Source: European Commission, 2019

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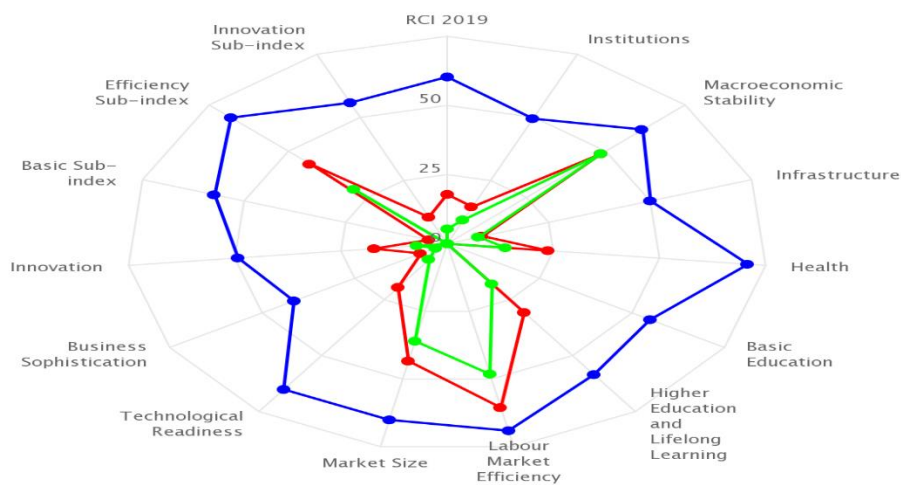
By component factors, we observe in figure 119 the fact that both Romania and the South-East Region register values well below the European Union average. One of the components of RCI 2019 is the capacity for innovation. We present in the figure below the results registered by Romania from the perspective of this component factor, being relevant for the present study. According to the index, our country has a low capacity for innovation, registering a score of only 17.17 points. The South-East Region obtained a score of 6.92 points, only the North-East Region having a lower score (6.2 points). In fact, Romania ranks last in almost all rankings of the indicators that make up this aggregate index. The capital region has the highest values in terms of competitiveness, but the positive effects on neighboring regions are limited.

Figure 120. European Regional Competitiveness Index (RCI), the innovation component, at the level of Romania and the component regions
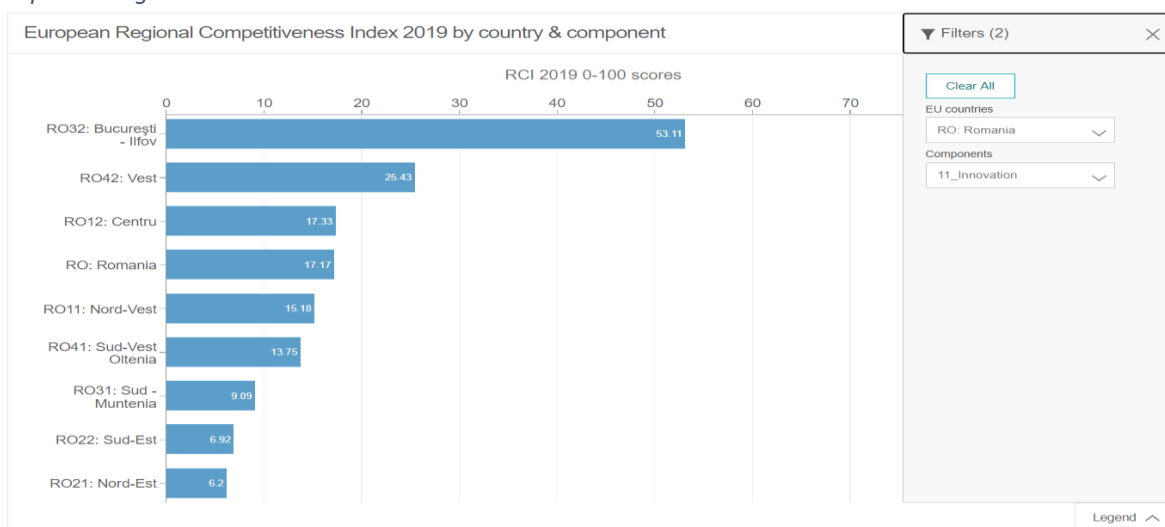
Sursa: Comisia Europeană, 2019

The European Commission's data and analyzes on competitiveness are summarized at NUTS-2 level (regions). In these conditions, in order to get a more accurate idea of the competitiveness potential at county level (NUTS-3) we chose to calculate a Competitive Potential Index (CPI) at the level of the South-East Region and the component counties. According to the methodology described by Cojanu (2011), the CPI consists of data obtained for GDP / loc., Exports / pop. busy and a Technological Development Index. The latter index is built on a classification of industries on four levels of technology use using Eurostat practice by equating the Harmonized System nomenclature with the CANE level nomenclature.

In order to build the Competitive Potential Index (CPI) at the level of the South-East Region, we selected three indicators:

I1. GDP/Inhabitants

I2. Exports/Employed population

I3. Technological development index

We calculated the Competitive Potential Index: CPI = (I1 + I2 + I3): 3

According to Cojanu (2011), the normalization of variables is done by the formula: $I_j = (x_j - x_{min}) : (x_{max} - x_{min})$ where x_j is the value of the characteristic x in county j, x_{min} is the minimum value of the characteristic, x_{max} is the maximum value of the characteristic. The value is between 0 and 1, where 1 represents the maximum potential.

I3 is a weighted score calculated for each county according to the structure of exports using the Eurostat classification for the grouping of industries by level of technological development:

$I3 = (p4 * 4 + p3 * 3 + p2 * 2 + p1 * 1) : 100$

Measuring scale:

4 - high technology exports (Percentage p4% of total exports by county)

3 - medium-high technology exports (Percentage p3% of total exports by county)

2 - medium-low technology exports (Percentage p2% of total exports by county)

1 - low technology exports (Percentage p1% of total exports by county)

Due to the complexity of this indicator, which involves aggregate statistical data from multiple sources, we chose to calculate the Competitive Potential Index for a single year, 2017, the last year for which we have statistical data on regional and county GDP.

I1. GDP / Inhabitant (year 2017)

We note that from the perspective of this indicator, Constanța County ranks first with 0.0537 million lei / place, almost half of the region's GDP being obtained in this county. At the opposite pole is Vrancea County, which although has a higher GDP than Tulcea County, there is a significant demographic difference between the two territorial units that disadvantage Vrancea County.

Table no. 31 . GDP / Inhabitant South-East Region, year 2017

	GDP (millions of lei)	INHABITANTS (per person)	GDP / LOC (mil.lei / nr.pers)	Ij = (xj-xmin): (xmax-xmin)
SOUTH-EAST region	87914.5	2447305	0.0359	0.36
Brăila	9631.4	299087	0.0322	0.23

	GDP (millions of lei)	INHABITANTS (per person)	GDP / LOC (mil.lei / nr.pers)	Ij = (xj-xmin): (xmax-xmin)
Buzău	11879.7	425842	0.0279	0.07
Constanța	36424	678316	0.0537	1.00
Galați	14672.8	515297	0.0285	0.09
Tulcea	6794	200706	0.0339	0.28
Vrancea	8512.6	328057	0.0259	0.00

Source: Data processing - National Institute of Statistics , 2020

I2. Exports / Employed population (year 2017)

In terms of exports / population, Constanta County is positioned all first (7.033 Euro) followed by Galați County (5.674 Euro). The weaker exports relative to employment is in the county of Brăila (1.518 Euro) and Vrancea (2.004 Euro).

Table 32 Exports/Employed population, South-East Region, year 2017

	Exports (thousand euros)	Employed population (thousand people)	Exports / Pop.occupied (thousand euros / thousand people)	Ij = (xj-xmin): (xmax-xmin)
SOUTH-EAST Region	4327357	949.6	4557.0	0.55
Brăila	181204	119.3	1518.9	0.00
Buzau	643721	158.1	4071.6	0.46
Constant	1999696	284.3	7033.8	1.00
Galați	1004461	177	5674.9	0.75
Tulcea	236873	80.5	2942.5	0.26
Vrancea	261402	130.4	2004.6	0.09

Source: Data processing - National Institute of Statistics , 2020

I3. Technological development index (2017)

The technological development index is built on the basis of a classification of industries on four levels of technology use using Eurostat practice by equivalence between the nomenclature of the Harmonized System and the one at CANE level (Cojanu, 2011). To calculate this indicator for the component counties of the South-East Region , we used the monthly statistical data on exports (FOB) by counties and by sections / chapters of the Combined Nomenclature.

From the analysis we notice that regarding the capitalization of technology in productive activity, in 2017, in the South-East Region predominates exports of medium-low technology (58.88%), followed by low technology (37.22%). 3.84% of total exports are high medium technology and only 0.06% high technology. By product categories, exports of mineral products, base metals and articles thereof, means and materials of transport, textiles and textile articles predominate.

Table no. 33 . Technological Development Index Southeast Region, 2017

South-East Region	Thousands of euros	%
HIGH TECHNOLOGY	2745	0.06
HIGH MEDIUM TECHNOLOGY	166064	3.84
LOW MEDIUM TECHNOLOGY	2548000	58.88
LOW TECHNOLOGY	1610548	37.22
TOTAL	4327357	100.00
I3 = (P4 * 4 + P3 * 3 + P2 * 2 + P1 * 1) / 100		1.67

In Brăila county, exports of low technology predominate, especially textiles and textile articles, means and materials of transport and live animals and animal products.

Table no. 34 . Brăila County Technological Development Index, 2017

BRĂILA county	Thousands of euros	%
HIGH TECHNOLOGY	136	0.08
HIGH MEDIUM TECHNOLOGY	7126	3.93
LOW MEDIUM TECHNOLOGY	63640	35.12
LOW TECHNOLOGY	110302	60.87
TOTAL	181204	100.00
I3 = (P4 * 4 + P3 * 3 + P2 * 2 + P1 * 1) / 100		1.43

In Buzău county, low-tech exports predominate, especially base metals and articles thereof, textiles and textile articles, animal and vegetable fats and oils, and food, beverages and tobacco.

Table no. 35 . Buzău County Technological Development Index, 2017

Buzau County	Thousands of euros	%
HIGH TECHNOLOGY	390	0.06

	Thousands of euros	%
HIGH MEDIUM TECHNOLOGY	29871	4.64
LOW MEDIUM TECHNOLOGY	223610	34.74
LOW TECHNOLOGY	389850	60.56
TOTAL	643721	100.00
I3 = (P4 * 4 + P3 * 3 + P2 * 2 + P1 * 1) / 100		1.44

In Constanța County, exports of medium-low technology predominate, the county exporting mainly mineral products, means and materials of transport, vegetable products, live animals and animal products, but also plastics, rubber and articles thereof.

Table no. 36 . Constanța County Technological Development Index, 2017

Constanta county	Thousands of euros	%
HIGH TECHNOLOGY	509	0.03
HIGH MEDIUM TECHNOLOGY	26816	1.34
LOW MEDIUM TECHNOLOGY	1328635	66.44
LOW TECHNOLOGY	643736	32.19
TOTAL	1999696	100.00
I3 = (P4 * 4 + P3 * 3 + P2 * 2 + P1 * 1) / 100		1.69

In Galați County, the largest exports are of medium-low technology, the county mainly exporting base metals and articles thereof, means and materials of transport and plant products.

Table no. 37 . Technological development index, Galati county, 2017

Galati County	Thousands of euros	%
HIGH TECHNOLOGY	920	0.09
HIGH MEDIUM TECHNOLOGY	59147	5.89
LOW MEDIUM TECHNOLOGY	830365	82.67
LOW TECHNOLOGY	114029	11.35
TOTAL	1004461	100.00
I3 = (P4 * 4 + P3 * 3 + P2 * 2 + P1 * 1) / 100		1.95

In Tulcea County, the value of exports is low, predominating low-tech exports, especially means and materials of transport and textiles and textile articles.

Table no. 38 . Tulcea County Technological Development Index, 2017

Tulcea County	Thousands of euros	%
HIGH TECHNOLOGY	138	0.06
HIGH MEDIUM TECHNOLOGY	31536	13.31
LOW MEDIUM TECHNOLOGY	82080	34.65
LOW TECHNOLOGY	123119	51.98
TOTAL	236873	100.00
I3 = (P4 * 4 + P3 * 3 + P2 * 2 + P1 * 1) / 100		1.61

In Vrancea County, low-tech exports predominate, the main exported products being textiles and textile articles and wooden products, excluding furniture.

Table no. 39 . Vrancea County Technological Development Index, 2017

Vrancea County	Thousands of euros	%
HIGH TECHNOLOGY	652	0.25
HIGH MEDIUM TECHNOLOGY	11568	4.43
LOW MEDIUM TECHNOLOGY	19670	7.52
LOW TECHNOLOGY	229512	87.80
TOTAL	261402	100.00
I3 = (P4 * 4 + P3 * 3 + P2 * 2 + P1 * 1) / 100		1.17

In order to calculate the Competitive Potential Index, we normalized the variables by the formula: $Ij = (xj - xmin) : (xmax - xmin)$ where xj is the value of the characteristic x in county j, $xmin$ is the minimum value of the characteristic, $xmax$ is the maximum value of the characteristic . The value is between 0 and 1, where 1 represents the maximum potential.

Table no. 40 . Competitive Potential Index at regional and county level, 2017

Competitive Potential Index (year 2017)	I1	I2	I3	IPC
SOUTH-EAST region	0.36	0.55	0.64	**0.52**
Brăila	0.23	0.00	0.33	**0.19**
Buzău	0.07	0.46	0.35	**0.29**
Constanța	1.00	1.00	0.67	**0.89**

Competitive Potential Index (year 2017)	I1	I2	I3	IPC
Galați	0.09	0.75	1.00	**0.61**
Tulcea	0.28	0.26	0.56	**0.37**
Vrancea	0.00	0.09	0.00	**0.03**

Analyzing the results from the table, we can conclude that the South-East Region has a low potential for competitiveness, with an average of 0.52. Among the analyzed counties, Constanța county has the highest competitive potential (0.89), followed by Galați county (0.61), at the opposite pole being Brăila county (0.19) and Vrancea county, with a CPI of only 0.03.

Referring to the three indicators presented, which analyze through complex methodologies the degree of competitiveness of a territorial unit: the Global Competitiveness Index (WEF), the European Regional Competitiveness Index (European Commission) and the Competitive Potential Index, we can conclude that our country suffers from a strong negative gap in terms of competitiveness compared to other EU member states. As far as the South-East Region is concerned, the competitiveness index is well below the European average, with the region requiring consistent and sustained efforts in the coming period to close the existing gaps.

Regional activity of innovation and technology transfer

Innovative companies

Innovation is the introduction into the work process of a new or significantly improved product (good or service) or a new or significantly improved procedure (process), a new method of organization or marketing. Innovation is based on the results of new technologies, technological developments, new combinations of existing technology or the use of other knowledge gained by the enterprise.

The data provided by the National Institute of Statistics cover the period 2014-2016. Although the provisional data for the period 2016-2018 were launched in the public space by the INS at the level of 2018, they cover only the provisional data at national level, without aggregating them at regional / county level. However, a decrease in the number of innovative SMEs in the South-East Region can be seen by 8.73% between 2014 and 2016, while the number of large innovative enterprises (SMEs) decreased by 15.91% in the same period. In terms of breakdown by type of activity, companies operating in the industry are, at the level of the South-East Region , more innovative compared to companies providing services. Indeed, in 2014, companies in the industrial sector accounted for 57.67% of all innovative enterprises in the South-East Region , while in 2016, their share increased to 58.26%.

In the period 2014-2016, at the level of the South-East Region, the share of innovative enterprises was 16.9%, representing the highest level of innovation among all development regions of Romania. The North-East Region was ranked 2nd with a share of 13.8% of innovative enterprises, followed by the

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North-West Region with a share of 13.2%. Although it is the most important development region of Romania as a share of the national GDP, the Bucharest-Ilfov Region ranked 4th with a share of only 10.5% of innovative enterprises out of the total number of enterprises in the region.

Regarding the breakdown by type of innovation, at the level of the South-East Region , the enterprises that introduced product and/or process innovations ranked first with a share of 7.4% of the total enterprises. On the second place are the enterprises with organizational and/or marketing innovation, with 5.7% of the total enterprises. Companies that introduced both product/process and organizational/marketing innovations accounted for 3.8% of all enterprises at the regional level.

Figure no. 98. Innovative companies, by size classes and by development regions, 2014-2018

Source: Data processing - National Institute of Statistics, 2020

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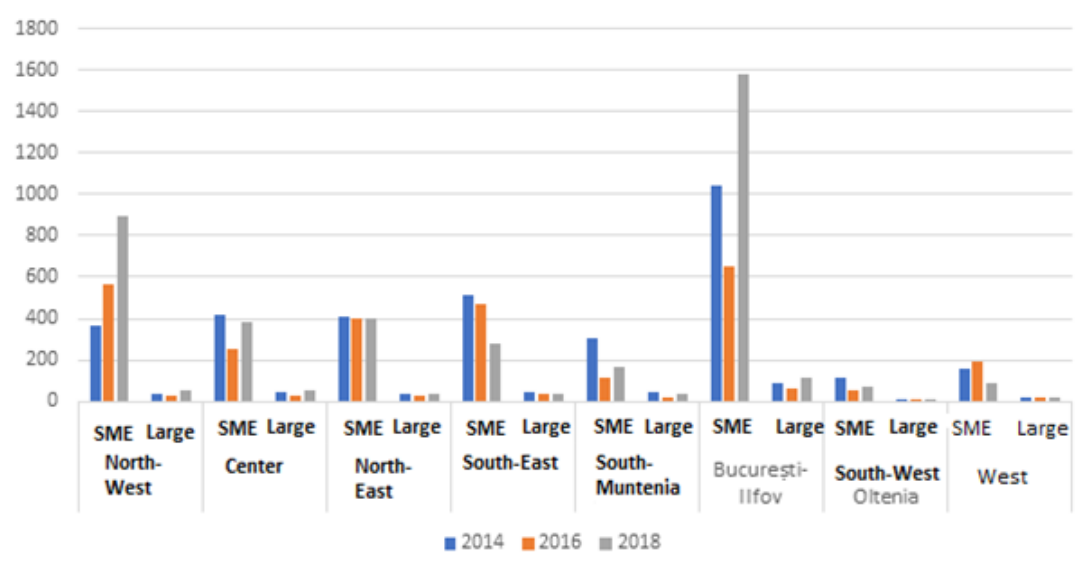
Figure no. *99. Innovative companies, by activity sectors and by development regions, 2014-2018*
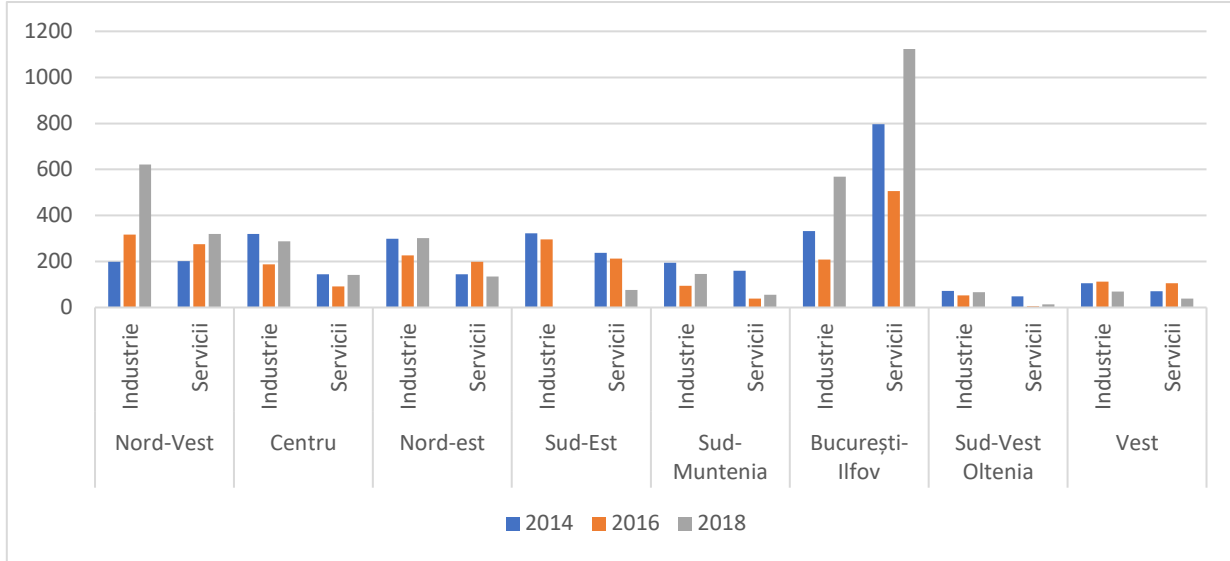
Source: data processing – NIS, 2020

Figure no. 100. Innovative companies, by type of innovation and by development regions, 2014-2016
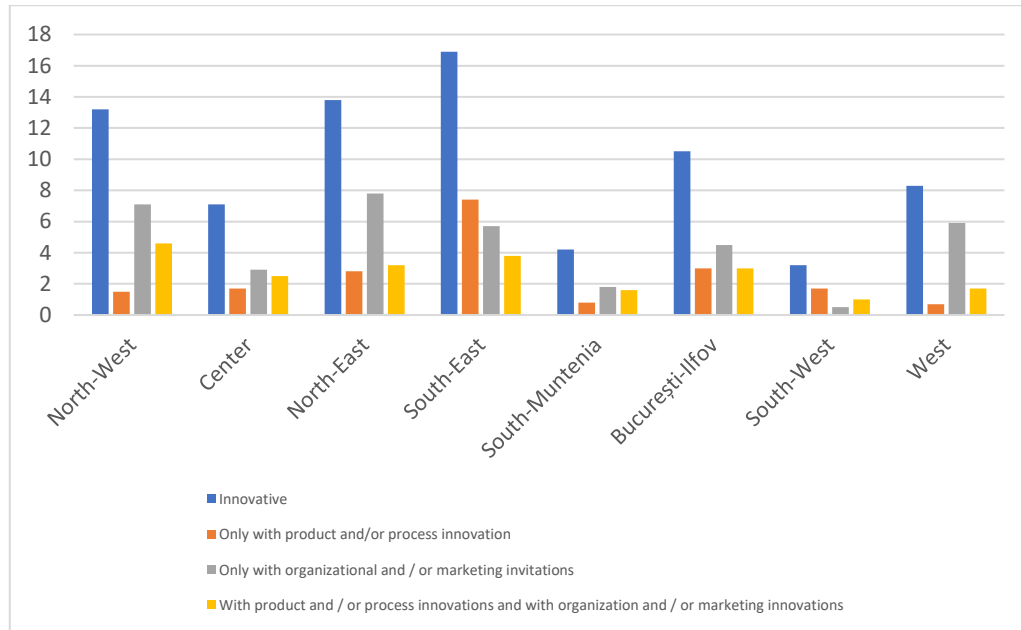
Source: data processing – NIS, 2020

Clustering potential in the South-East region

The term "cluster" has been intensely debated in the international scientific literature, and there is no unanimously accepted definition. According to Michael Porter, clusters are geographical concentrations of interconnected companies, specialized suppliers, service providers, companies in related industries, universities, research institutes and trade associations, local public administrations in specific fields, which compete but also cooperate (MEEMA, 2019)[26].

According to the national legislation, respectively GD 918/2006, the cluster is definitive as a group of producers, used and / or beneficiaries, in order to implement good practices in the EU in order to increase the competitiveness of economic operators. Thus, in general, clusters comprise enterprises, universities and / or research institutes and public authorities.

Below, it is presented the most important clusters in the South-East Region, according to the Clustero.eu website:

Cluster Traditions Manufacture Future TMV South East

Founded in 2010, it aims to promote and protect the interests of the commercial companies that are members producing textiles, knitwear, leather, suppliers of materials and services through actions that contribute to the strengthening and development in the medium and long term of its members.

The companies, universities, research institutes and public authorities that are part of this cluster are:

Trading companies	Universities	Research Institutes	Public authorities
SC SORSTE SA SC COMUNIVERS SRL SC COROLA SRL SC PRODECOM SRL SC INMARTEXTIL SRL SC TRICOTTON PANCIU SRL SC CONTEMPO SRL SC SERITEX SRL SC VERON SRL SC TOORICH SRL	Faculty of Textiles, Leather and Industrial Management Iași University of Arts and Design Cluj-Napoca	National Research and Development Institute for Textiles and Leather Bucharest	South-East Regional Development Agency

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[26] http://economie.gov.ro/images/domenii/clustere.

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Regional Cluster „Green Solutions Lower Danube"

The Regional Cluster "Green Solutions Lower Danube" aims to plan and carry out activities with the purpose of promoting and developing mechanisms to support the entire geographical area "Lower Danube", in the long term, as a leader in renewable energy, energy efficiency and new energies and participation in international networks as a partner or project coordinator to increase the competitiveness of the Association's organizations, through national and international cooperation.

The cluster aims to strengthen the collaboration, in the field of research, between the university environment, research institutes and companies but also to find strategies for the development of the cluster at national and European level. The development of the cluster will be ensured by identifying the sources of non-reimbursable financing and the development of projects for obtaining funds with non-reimbursable financing, as well as attracting other resources (investments, state aid schemes, etc.).

The companies, universities, research institutes and public authorities that are part of this cluster are:

Societăți comerciale	NGOs	Universities	Research institutes
IPA S.A. București	Lower Danube Regional Energy and Environment Association	Danubius University "Dunărea de Jos" University of Galați	National Research and Development Institute for Textiles and Leather Bucharest

BIO DANUBIUS Cluster

The Bio Danubius Cluster aims to harmonize and represent the interests of enterprises, research, administration and catalyst entities in order to increase economic competitiveness and job creation, sustainable development of the South-East development region, internationalization of members, professional development of managers and employees, managing a common database, participating in national and European networks, increasing the innovation potential of enterprises in the sectors: Bio-economy and Organic Agriculture; Pisciculture; Tourism; Logistics and transportation; Environmental protection and conservation; Renewable energies; Creative and cultural sectors; Social innovation.

Thus, the cluster offers services such as: access to foreign markets, identifying business opportunities, participating in international promotional events, branding and marketing, technology transfer, drafting European projects, creating consortia and participating in research projects, training, consulting and workforce qualification.

INOMAR Cluster

The mission of the INOMAR cluster in Constanța is to become the environment of interaction and communication preferred by the operators of the value chain of tourism in order to innovate and reinvent the values of Dobrogea.

The cluster has an impressive number of members, most of them companies, their list being presented below:

Companies	Vard Electro Tulcea SRL, Schneider Electric Romania SRL, RYWAL-RHC Romania SRL, Sandblasting SRL, GLO Marine, HMA-PATEC, TIE Services International SRL, Keep It Mobile, Marine & Offshore Consultants, Cozmircom SA, Nexans Romania, Wärtsilä Hungary Kft Budaors, Klingspor Romania, RED Royal Expert Design, Van Der Leun, LLOYD Register Romania SRL, ABS Classification SRL, Linde Gaz Romania, SEVERNAV SA Drobeta Turnu Severin, KAEFER Shipbuilding Contracting, Alewinjnse, Liberty Galati, Bureau Veritas Romania, Damen Shipyards Mangalia, Damen Shipyard Galati, Den Breejen Romania, DNV-GL, DMT MARINE EQUIPMENT, Ductil, Eekels Romania, Heinen si Hopman, Helmers Group, ICEPRONAV ENGINEERING SRL, International Paint, Shipyard ATG Giurgiu , Ship Design Group ,Santierul Naval Constanta Navrom Shipyard, Nasdis, Microplasma, MEGA, Minex, P.A. LIBRA, RO OUDCOMB TRADING SRL, SANTIERUL NAVAL ORSOVA SA, SEN ENGINEERING SOLUTIONS SRL, Danfoss Romania, Vard Brăila, Vard Tulcea.

The main objectives of this cluster are:

- Consolidation of technology transfer actions for tourism.
- Leveraging the local potential of resources.
- Extension to 6 months of the period of visiting the coast.
- Attracting as many active members as possible in the cluster.
- Promoting quality and operational excellence in destination management.

The main actions of the cluster are:

- Inventory of problems, challenges and opportunities.
- Adoption of a quality standard of tourist experiences.
- Synchronization of supply-demand relations on the tourism resource market
- Financing and development of a vocational training center for tourism

The members of the association are Manor Laboratory Center, LTA Mondial, AGRICHIM, Danube Delta Biosphere Reserve Tulcea, Bio Romania Association, INCDD Tulcea and Spiru Haret University.

MEDGreen CLUSTER Association

The purpose of the "Cluster" Association for the Promotion of Specialized Businesses in Ecotechnologies and Alternative Energy Sources (MEDGreen Cluster) is to facilitate and promote cooperation between enterprises, business people, research and educational institutions, as well as other organizations that contribute or support activities. innovative for the realization of competitive products and services at national and international level, with high added value and to generate jobs and opportunities for sustainable development of the city of Medgidia and the surrounding areas.

Companies	Universities	Research institutes	Public authorities
SC Solarom SRL SC Ecohorneț SRL SC Black Sea Energy Systems SRL SC Dache & Fiul SRL SC NEWAGRO SRL SC Darv Machine Tools SRL SC Arman Construction SRL SC Monsson Alma SRL SC Gomez Team Invest SRL SC Metalica SRL SC Klean Eco Plus SRL SC FINNRO Development SRL	Lower Danube University Bucharest University	-	The Municipality of Medgidia Cumpăna Commune City Hall Romanian Car Registry Ovidiu City Hall

The services offered by the MEDGreen Cluster Association are:

- Legal advice
- Fundraising consultancy
- Consultancy for accessing financial services
- Innovation services
- International cooperation
- Impact studies
- Maintenance services for biogas plants
- IT services

- Technological risk management services.

The areas of action of the cluster include:

- Establishing and developing collaborative relationships between cluster member companies in a favorable business environment, respecting the rules of fair competition, through their own means and through the efforts of members;
- Collaboration with national and international government institutions to facilitate economic missions and business visits in the field of activity of the cluster, in order to develop mutually beneficial economic collaboration;
- Supporting and promoting the research and innovation activities of the economic agents in the area, facilitating the transfer of policies, management, advanced technology;
- Organizing technical-economic events with major impact on the business and socio-cultural environment;
- Promoting new and renewable energy sources on the national and regional market;
- Promoting and harmonizing joint activities in the field of environmental protection.

Lower Danube Health Cluster

The Regional Cluster "For Health Lower Danube" was born from the desire to elaborate joint projects in order to develop products and services for maintaining health. The main objectives are: promoting information and health education; developing and promoting new techniques and systems in order to maintain health; improving access to the medical market; support and promotion of a unified health framework among the beneficiaries of a decent standard of living and implicitly of health.

Trading companies	Universities	Research institutes	Public authorities
SC Industrial Park SRL Galați **SC Thecon SRL** **SC Altfactor SRL** **SC IPA SA** **Cluster Medgreen** **Consorțiul Clusterelor Dunărea de Jos**	Danubius University Lower Danube University	"Benone Pușca" University Foundation	Galati City Hall Galati Chamber of Commerce, Industry and Agriculture

IT&C Cluster Lower Danube

Cluster for the ICT industry, "Clusterul IT&C Dunărea de Jos" Galați was established in 2015 and aims to sustainably develop its members, increase research and development capacity and stimulate cooperation between research - development and innovation institutions (RDI) and enterprises, as well as increasing the access of enterprises to RDI. Currently, according to the cluster's website, it has 37 members, both public institutions and companies with activities in the IT&C field.

Other objectives of the cluster are:

- Capitalizing on the potential of information and communication technology and its application in the public sector (administration, education, health) and the private sector (enterprises, citizens);
- Creating the premises for increasing the competitiveness of enterprises in the ICT sector, based on the intensive use of knowledge;
- Increasing the regional competitiveness of IT education;
- Representing the interests of the ITC environment before the state bodies;
- Creating mechanisms for the collaborative approach of large international projects;
- Supporting entrepreneurship and SMEs in the field of ITC in the region;
- To identify and promote a series of investment projects, both public and private, as well as proposals for modernization / improvement of strategies, policies and action plans in the field of ICT;
- Strengthen cooperation between the various actors in the field of information and communication technology, the exchange of information and ideas, as well as through joint activities.

Romanian River Transport

The Romanian River Transport cluster was established in order to create a unitary framework for cooperation and collaboration between its members, the accomplishment of missions / objectives of common interest regarding the establishment of the cluster for the ecological intermodal transport of Romanian inland goods.

The members of this cluster are presented in the table below:

Table no. 41 . Members of the Romanian River Transport cluster

Universities	Research institutes	Public authorities	Catalysts	Other members
"Danubius" University of Galati	SC IPA SA Bucharest, Galati Branch	Galati City Hall	Union of Romanian Inland	National Company "Administration Ports of the Maritime Danube "- SA Galați (CN APDM SA);

Universities	Research institutes	Public authorities	Catalysts	Other members
"Dunărea de Jos" University of Galați "Mircea cel Bătrân" Naval Academy from Constanța	Romanian Center for Staff Training and Development (CERONAV)		Ports (UPIR) Industrial Parc SRL	National Company "Administration Danube River Ports "- SA Giurgiu (CN APDF SA); National Company "Administration Navigable Channels "- SA Constanța (CN CAN SA); National Association of Shipbuilders from Romania (ANCONAV), Industrial Parc SRL from Galati, Shipowners Association and Port Operators in Romania (AAOPFR) from Galați, River Navigation Company Romania "Navrom" SA (CNFR Navrom SA), SC Romnav SA, SC Deltanav SA, SC Navrom Shipyard SRL, SC Cojar SRL, SC Romprima SRL, Regional Energy Association and Environment of the Lower Danube, Tehnopol Galati, SC Docuri SA Galati, SC Port Bazinul Nou Galati , SC Ecoarch SRL.

Open Hub Cluster

OpenHub is a cluster driven by a passion for IT and everything that means applications of communication technology in business. It is, at the same time, a project dedicated to communication and development mainly through interaction and exchange of experience. The main role in the development of this vision will be represented by the cluster, by associating the entities in the field of creative industries, being an adequate framework for dialogue and cooperation through the development of strategic and sustainable partnerships at regional level.

The current members of the cluster are:

- Galati Open Hub Association
- Thecon SRL, Galati
- Adquest Image SRL, Galati
- Inosoft Lean Sytem SRL, Galati
- Tacit Pay SRL, Galati
- Fly Onix SRL, Galati
- Active Mall SRL, Galati
- Septagon Project SRL, Galati
- Lavionda 2008 Impex SRL, Galati
- Elco SRL, Galati
- IMD Legis SRL-D, Galati
- Kinelink Moovee SRL, Galati
- " Dunarea de Jos" University of Galati

InnoSTArts Innovative Cluster (ISTA)

By setting up the InnoSTArts Innovative Cluster (ISTA), the aim was to create a strategic alliance to assume, for the South-East Region, the role of organizer and promoter of the cultural and creative sectors , bringing together organizations such as universities and development centers, industry representatives and public authorities.

The members of this cluster are presented in the table below:

Universities	Research institutes	Public authorities	Catalysts	Other members
"Dunărea de Jos" University of Galați	SC IPA SA Bucharest, Galati Branch	Ivești City Hall	Association for Sustainable Development and Innovation in the South-East Region	Altfactor SRL Children Software SRL Nonlinear SRL Demac Innovation Management SRL Ecoprint Publicitate SRL Studio Call Communication SRL Play Arhistart SRL Carta Structura SRL Messenger SRL "Sons of Obilești " Association Voicu Consult P SRL Lemland SRL EM District Laboratory SRL ABCPrintUV3D SRL Asist Business Development Group SRL

The Lower Danube Agroindustrial Innovative Cluster

The establishment of the Innovative Agro-Industrial Cluster "Lower Danube" is based on the vision according to which the harmonious and balanced development of the entire South-East Region, with the elimination of development gaps between different areas of the region and especially between urban and rural areas, is a absolute priority.

In this sense, out of the desire to ensure the sustainable development of the South-East Region , in general, and of the rural environment in particular, it is more than necessary to support the revitalization of the regional agro- industrial sector . For this, a first step was the establishment of the Innovative Agro-Industrial Cluster "Lower Danube".

The members of this cluster are presented in the table below:

Universities	Research institutes	Public authorities	Catalysts	Other members
"Dunărea de Jos" University of Galați	SC IPA SA Bucharest, Galati Branch	Ivești City Hall	Pontic SRL Agency PFA Iorga Dinu	Demac Innovation Management SRL Lemland SRL Children Software SRL Nonlinear SRL EM District Laboratory SRL Play Arhistart SRL Carta Structura SRL Messenger SRL Debitpal SRL II Lupașc Lucia Mirela "Sons of Obilești " Association Miarbal Prod SRL Reyravos Trade SRL Asist Business Development Group SRL

Business incubators

Business incubators are structures created to support the development of start-up businesses. The selected companies are hosted in a Business Incubator for a determined period of time (incubation cycle), during which they receive financial support, consulting services and office space. Along with the logistical support necessary to start the activity, the incubator offers a favorable environment for business development, by facilitating networking activities, the transfer of know-how and by providing support in the development of partnerships.

SME Employers' Association - The first business incubator in Constanța

Since 2004, the Constanța SME Employers' Association has been a business incubator. With the implementation of the CLASS NETWORK Project when, in Constanța, the CLAS Center was established, but also the first company through a Phare project, which received a prize of 3,000 euros. Along with the logistical support needed to start the activity, the incubator provides an environment conducive to further business development, companies receiving development support in the first years of activity.

The activities of the business incubator are:

- Consulting and assistance both for starting a business and for increasing the development potential of small and medium enterprises with ongoing activity;

- Preparation of business plans;
- Legal advice and assistance for setting up a company;
- Consulting and assistance in the fields of financial-accounting, human resources, quality management, marketing and sales;
- Consulting on funding sources, preparation of documentation for programs with non-reimbursable / reimbursable funding.

Industrial parks at the level of the South-East Development Region

There are two industrial parks and a software park in the South-East Development Region.

Galați Industrial Park

Galati Industrial Park is managed by Industrial Parc SRL. It has a total area of 21.8 hectares and is located on the banks of the Danube in the southeast of Galati. The purpose of the Industrial Park is to support the local and regional economy, its horizontal development and the creation of jobs for the highly qualified workforce offered by graduates of universities in Galați, but also for the qualified one.

The Industrial Park is a delimited area, where economic activities, research, industrial production and services are carried out in order to develop and capitalize on the natural and human resources of the area. Resident of the park can be any economic operator, Romanian and / or foreign legal entity, NGOs, research institutions and other units that do not have legal personality, which operate according to the law and carry out economic activities, scientific research, research capitalization scientific and / or technological development, agro-industrial, logistical and innovative, industrial, etc., within the industrial park, based on the administration and related services contract concluded with the park administrator.

The infrastructure of the industrial park includes:

- An administrative headquarters of 1463 sqm;
- Storage hall of approximately 1100 sqm;
- Utilities: running water, sewage treatment plant, electricity.

The advantages of the Galati Industrial Park are given by the strategic location in the immediate vicinity of the Galati Free Zone, on the border with Ukraine and the Republic of Moldova, with access to the Danube shore, 80 km from the Black Sea. It has access to the main river transport (Rhine - Main - Danube canal), Russian-European mixed railway transport (including the transfer to the wide gauge) and road by the national road DN 2B.

It has access to docks so that the companies within it can benefit from port services: loading / unloading a wide range of goods; stacking / mooring of goods on any means of transport; storage on concrete platforms and / or in warehouses.

The Industrial Park can populate the business support infrastructure it offers with the following types of services and activities:

- One-Stop-Shop, with services for entrepreneurs and investors - business establishment, legal advice, tax consulting;
- Non-reimbursable and reimbursable financing for SMEs - assistance and consultancy;
- Workspace and cooperation for mini-entrepreneurs, innovators, researchers - promoting the co-working system;
- Training and vocational training by developing open training and vocational training programs, and attracting funding for these programs;
- Global connection through the development of an international cooperation network, Galați will be positioned as a competitive destination and connected to Europe's business trends.

Mangalia Industrial Park

Mangalia Industrial Park is managed by SC Mangalia Industrial Park Administration SRL. It has an area of 13.1 ha and is located at a distance of 1.5 km west of Mangalia. The land is the property of Mangalia Municipality. The park has easy access to the county road DJ 391, Mangalia Negru-Vodă, but also to the European road E 85 (DN 39) Constanța - Mangalia. It has access to the railway and the port of Mangalia. The proximity of the border to Bulgaria creates opportunities for the development of import-export activities and cross-border cooperation.

The main advantages it offers to economic agents are:

- road, rail and naval access;
- guarding and protection of buildings and property;
- advantageous rental rates for buildings and land in the first years of operation;
- the existence of buildings and warehouses on the premises that can be rehabilitated with reduced financial efforts;
- paved and concrete access roads to all buildings;
- infrastructure and utilities up to the work area;
- vacant land on which constructions can be made according to the applicants' projects;
- skilled labor force in the Mangalia area and neighboring localities

- the proximity of the two major shipyards creates special opportunities for horizontal subcontracting for the production of parts and subassemblies for the shipbuilding industry;
- the company managing the industrial park will provide advice to investors throughout the implementation of investments and the operation of production capacities. The consultancy will cover various aspects: legislation, obtaining approvals and agreements for achieving the objectives, construction design solutions, marketing, relations with suppliers and distribution networks, etc.
- location in an area in economic growth.

Accredited innovation and technology transfer entities

At the level of the South East Region there are 4 entities of innovation and technological transfer, most of them being at the level of two counties: Constanța and Galați. The activity and specifics of the accredited innovation and technology transfer entities are detailed below.

Danube Delta Technological Information Center (CITDD)

The Danube Delta Technological Information Center (CITDD) was created and endowed through the INFRATECH national program in 2005. Currently, CITDD is a member of various national innovation associations, such as the National Network for Innovation and Technology Transfer (RENITT), respectively the Romanian Association of Technology Transfer (AROTT).

The activity of CITDD is the absorption and diffusion of results of activity of research and development in the socio-economic area, in order to increase the quality and competitiveness of products, processes and services, creating new jobs and sustainable economic development in a competitive environment (conf. HG 406/2003).

CITDD organizes and supports various activities, including scientific information courses, respectively training courses and specialization of medium level in the field of environmental protection and management of biological natural resources. Among other things, the center facilitates student practice, collaborates with NGOs, high schools and schools in environmental education programs, facilitates collaboration with international bodies involved in environmental conservation and protection activities, and ensures the transfer and use of scientific publications to the central and local authorities, the scientific community, NGOs and economic agents.

CITDD offers various services , such as:

- Technological information ;
- Technological transfer ;
- Organize of scientific events ;
- Organize sessions of training , practice for students ;

- Organize activities mentoring/ views of information ;
- Editing and multiplying material;
- Technical support for participation in symposia, conferences or congresses.
-

Technology Transfer Center - "Lower Danube" University of Galați (CTT-UGAL)

At the level of the "Lower Danube" University of Galați, CTT-UGAL carries out its activity, being established to capitalize on the research results of the "Lower Danube" University of Galați, thus contributing to the intensification and stimulation of the research activity within the university and to attracting external collaborators in technology transfer activities. Specific activities for technology transfer are targeted, in the direction of capitalizing on the results of research and intellectual property of the institution, respectively the institutional expertise in the fields of teaching, research, development and innovation.

CTT-UGAL's work is based on the policy of the research and innovation program "Horizon 2020 - ensuring scientific excellence for Europe", aiming to attract European funding and create an environment of responsible and dynamic multidisciplinary cooperation on technology transfer within the university.

The role of CTT - UGAL is to increase the level of competitiveness of the national business environment, by providing specialized consulting services in the field of transfer of high level scientific and technical knowledge from academia to university partners. The main objectives of CTT - UGAL are:

- The development process of transfer technology from the University " Dunarea de Jos" Galati;
- Stimulating the professional development of the staff involved in technology transfer programs;
- Counseling multidisciplinary of staff internal and external of CTT -UGAL in terms of property intellectual, sale of technology , collaboration researchers - environment for business ;
- Supporting University "Lower Danube" in Galati for achieving indicators of performance institution in the process of increasing internal to quality;
- Mobilizing the staff of the " Dunărea de Jos" University of Galați in the innovation activity by promoting an entrepreneurial culture in order to learn the skills and attitudes necessary for a creative institution;
- Analysis of the horizon conducive to technology transfer in order to guide research from the University " Lower Danube" in Galați to areas of interest;
- Creating a system management effectively to transfer technology , associated activities of research - development - innovation of University " Dunarea de Jos" Galati;
- Development of programs for training continues to partners of the "Lower Danube" University flexible requirements of the market labor.

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Among services provided by the CTT-UGAL to include :

- Recruitment and placement of specialized labor force;
- Identify potential partners from the university and the research area;
- Design for presentations;
- Services for research - development - innovation;
- Services of information technology, auditing technology, forecast technology etc;
- Services of assistance and advice for the realization of models experimental and prototypes;
- Services of assistance and advice for exploitation rights of ownership intellectual;
- Services of assistance and advice in the field of law;
- Information with respect to the priorities of national , regional and local.

Center for Entrepreneurship and Technology Transfer (CATT) - Ovidius University of Constanța

The Center for Entrepreneurship and Technology Transfer (CATT) is an organizational and operational structure of the "Ovidius" University of Constanța, which is part of the Research and Innovation Department.

The mission of the Center for Entrepreneurship and Technology Transfer is twofold . On the one hand, CATT has the mission to develop, implement, monitor and evaluate policies University of supporting, developing and encouraging the spirit of entrepreneurship in turn teaching staff, students and graduates. On the other hand, the role CATT is to transfer the knowledge generated by research, development and innovation, in institutes and centers of research of the University " Ovidius " and the partner institutions, the companies of Dobrogea and Region South-East, for their support to become more competitive through the use of new technologies. Support is both scientific and technical, with mainly addressed start-ups innovative, to be engines of development in the region, but also companies that do not use enough facilities offered by computerization range of activities.

Galați Software Park

The Galati Software Park is established as an initiative of the consortium formed by the Galati County Council, the Galati Local Council, the "Lower Danube" University of Galati and S.C. Navrom - Business Center S.A. Galati. The consortium appointed as administrator of the park the company Cons Management PARC DE SOFT S.R.L., a company whose partners are the County Council and the Galati Local Council.

The Science and Technology Park in Galati aims to contribute to the development of the high-tech industrial sector, to facilitate technology transfer, as well as to create a viable alternative on the labor market in the South-East Region. The Software Park offers for use 64 offices with areas of 12 sqm, 22

sqm, 42 sqm or 70 sqm, a conference room with a capacity of 70 seats, a multimedia room, a training room, a protocol room, a server room as well as spaces for consulting and research.

Currently, a number of 40 companies operate inside the park, where a number of approximately 300 people work, but the process of forming work teams continues, reaching a number of 500 people.

The specialized services offered by the park are:

- business support services for innovation and technology transfer;
- research and development services;
- technological information services, technological audit, vigilance and technological forecasting;
- assistance and consultancy services for the realization of experimental models and prototypes;
- assistance and consultancy services for the exploitation of intellectual property rights;
- legislative assistance and consultancy services at national, European and international level.
- obtaining funds within national and international programs;
- identifying partners in the university and research environment;
- ensuring access to specialized databases;
- information on national, regional and local priorities.

In addition to these specialized services, the park offers marketing facilities, technical documentation facilities, communication facilities, collaboration with the university environment, facilities for organizing conferences and trainings, but also financial assistance - accounting, tax and legal.

Training centers

According to the National Authority for Qualifications, in the South-East region there were 3 training centers that had a valid operating license in October 2020 for various occupations such as waiter, trade worker, blacksmith, mason, painter, farmer, locksmith and so on. The National Register of the Centers for evaluation and certification of professional competencies obtained in other ways than the formal ones had registered at the time of elaboration of the analysis only entities from Buzău County. Even if the diversity of qualifications is important, concentrating access in one county increases the discrepancies within the region decreasing the chance of qualification or professional retraining for many people, especially for those in disadvantaged categories for whom moving to another county is not possible.

Digitalization

A digital single market is one of the EU's newest transnational projects, which aims to develop the regulatory framework for the development of cloud technologies and access to data transfer on mobile

devices. This regulation must to take into account the right to privacy, the protection of personal data and cyber security. The need for regulation is increasingly felt in European society as both the market and government services are evolving from fixed to mobile platforms. Therefore, the digital single market aims to remove all national barriers to online transactions.

For more than 10 years, the proposals of the EU authorities have been increasingly detailed in this area of digitalization, and the intersection with other areas is becoming increasingly evident. The real and digital economy merge with each digital application, improving the lives of citizens, increasing opportunities for cross-border collaboration, facilitating the life of civil society and the business environment. The fastest technological revolution is transforming society every day, and the European Union needs a harmonization of development visions in order to ensure the competitiveness of European enterprises and to increase the quality of governance.

The pandemic context of 2020 forced the digitization process, both for private and public actors. For both categories of actors, the digital transformation leads to increased productivity and performance, reducing both work-related risks and environmental impact. The Romanian workforce is facing new requirements from employers, the latter needing people qualified in newly created specializations and staff with digital technological knowledge. The public administration benefits from constant improvements of workflows, the avoidance of human errors in the processing of data and information, the reduction of working time, all this translating into the increase of citizens' satisfaction.

The new risks arising from this process of digital transformation are a disadvantage that can be overcome by a process of specialization of personnel in the field of cybersecurity and by a special attention to the protection of data, networks and information systems by citizens and businesses, as well as by public authorities.

Romania's situation is a delicate one at the moment, being one of the states that needs consistent investments in order to avoid the negative effects of the risks and to reap the benefits of the latest progress. According to DESI (Digital Economy and Society Index) data from the report published in 2020, Romania is on the last but two place in the EU, Greece and Bulgaria closing the ranking. The following graph shows the situation at European level.

Figura nr. 101. Digital Economy and Society Index, 2020
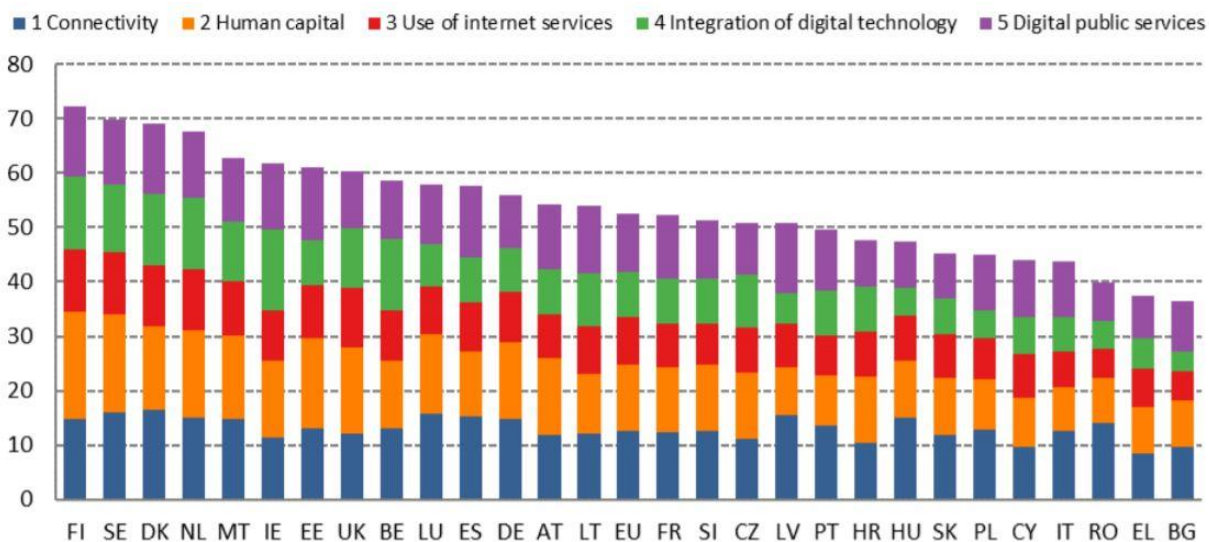
Source: DESI 2020, European Commission

Un alt indicator care urmărește stadiul procesului de transformare digitală este cel care măsoară frecvența utilizării calculatorului. Astfel, analizând ultimele date Eurostat disponibile, se poate observa că frecvența de utilizare a calculatorului înregistrează un trend ascendent, la fel ca folosirea internetului, pentru statele cu o calitate a guvernării crescută. România înregistrează o creștere semnificativă în ultimii ani, însă este foarte important ca aceasta să fie asociată cu o creștere a alfabetizării digitale a populației.

Figura nr. 102. Percentage of the population that used the computer daily
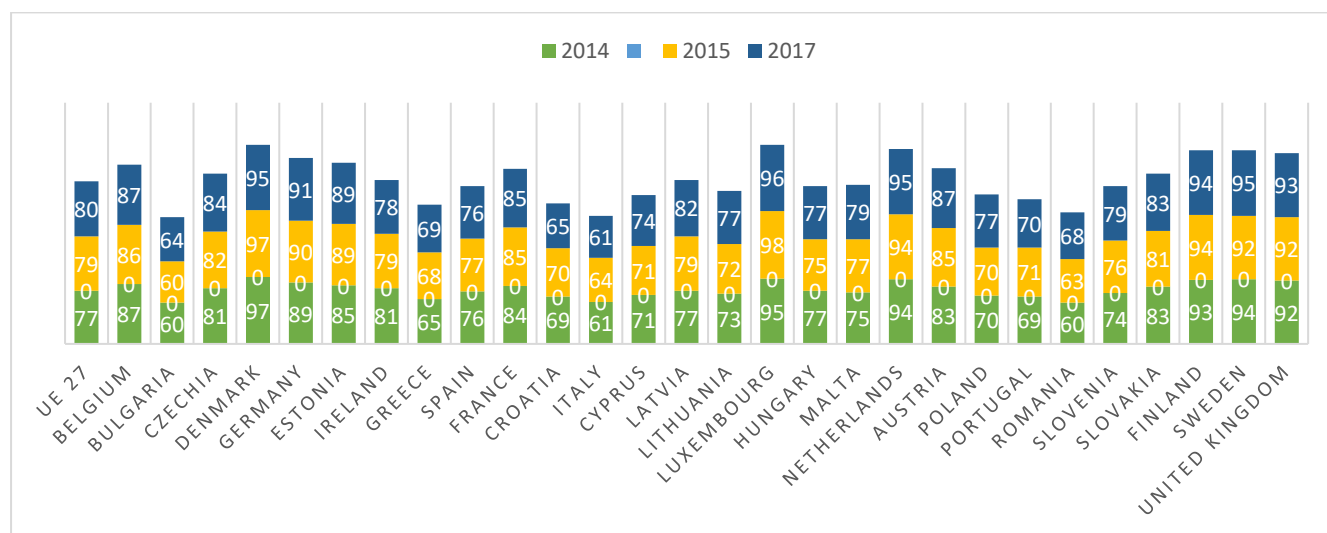
Source: data processing Eurostat, 2020

The analysis of data measuring the percentage of computer use and mobile media that have access to the Internet shows a significant increase in the latter. The data provided by Eurostat in this regard cover two years, respectively 2016 and 2018, allowing a comparative analysis, as digitization is a very fast process. Important differences can be observed, especially in terms of the use of the Internet on mobile, Romania registering here a substantial increase compared to the use of the Internet on the computer, which decreased[27]. This increase in the use of mobile technologies may be due to more affordable prices compared to those for purchasing a computer. Romania remains the state with the lowest percentage of citizens who access the Internet. In general, most European citizens used the internet on a mobile medium more in 2018 than in 2016, confirming the growing need for regulation in the field. Eurostat data also ranks Romania last in terms of individuals' digital skills, on a par with Bulgaria. The differences between these 2 states and the rest of the EU are very big[28].

The number of households connected to the internet at national level, depending on the development region, places the South-East Region in the last place in the last two years. The most digitized region is Bucharest-Ilfov, followed by the West Region. Even if in 2014 the South-East Region was on the 3rd place among the Romanian regions, the poor progress registered in the last years sent the region to the bottom of the ranking, being one of the most vulnerable to the risks related to the technological transformation. The following graph illustrates the evolution of all development regions, from 2014 to 2019.

Figura nr. 103. Dynamics no. of households connected to the Internet at regional level, 2014 - 2019
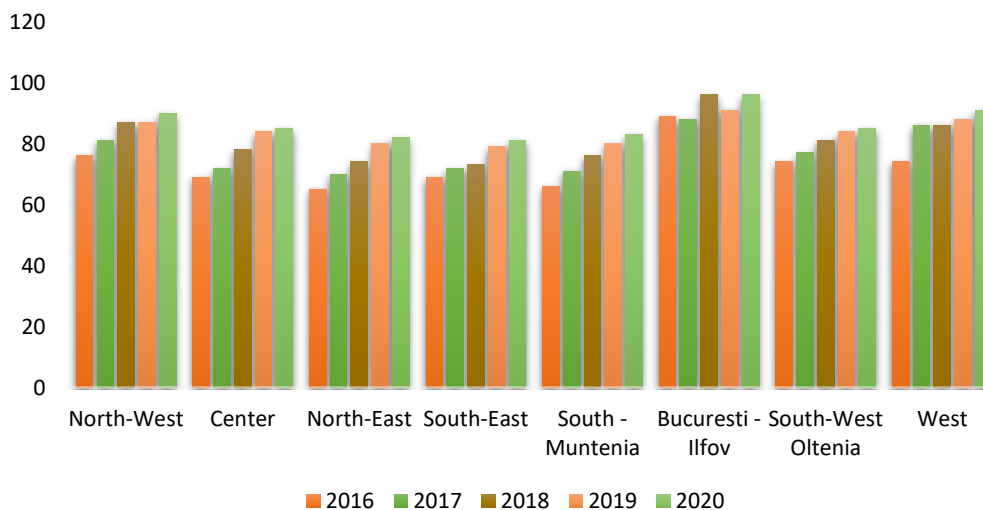
Source: Data processing - EUROSTAT, 2020

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[27] Analysis of Eurostat data on devices used for internet browsing, 2016 and 2018.
[28] Analysis of Eurostat data on digital skills of individuals, 2015 - 2019.

Regarding the devices from which the Internet was accessed in the South-East Region, mobile devices are the ones with the highest usage rate, according to data from 2018. Thus, more than 85% of the respondents who accessed the Internet in the last 3 months, they did it from a mobile device. Bucharest - Ilfov and North-West are the regions that have the highest rate of computer internet access, while the South-East region recorded in 2018 the lowest rate for this type of device.

Regarding the types of activities that individuals can carry out in their relationship with public authorities, the South-East region records average scores compared to other regions. Most often, the citizens of the region use the internet to obtain information, and most rarely to download official forms. The South - Muntenia and West regions are the regions where citizens use the Internet the least in interaction with public authorities, most only looking for information, very few downloading and submitting forms.

The goods that citizens buy on the Internet are diverse, but they also provide an image of their confidence in such services, needs and access to various resources. In Romania, at national level, the most purchased goods through the Internet are clothing and sporting goods, which occupy the first place for the South-East region. Music, movies and video games are the least ordered products on the internet by the inhabitants of the region, the dynamics being similar for all development regions.

Data security is very important in a digital society, so the protection measures taken by the population often make the difference between overcoming risks or facing the negative effects they can have on citizens. The South-East region has the highest percentage of internet users who have not used any security device (TOKEN) for online services, and in terms of procedures involving mobile phones, they represent only 11% of online procedures used to identify.

The COVID 19 pandemic mobilized the resources of the European Union in directions not initially planned as a priority or for which the plans provided for a longer implementation period. The two priority directions are climate neutrality and digital transformation. Thus, the European Commission envisages investing in the development of green technologies, energy efficiency in buildings and the development of the electricity transmission network, as part of the process of reducing the carbon footprint and transitioning to a circular economy. Regarding the digital transformation, it will be achieved through investments in:

- developing and updating the internet provision infrastructure;
- digitalization of public administration;
- sustainable growth and development of "cloud" services;
- adapting the educational system by making it accessible to all categories of citizens and by integrating digital literacy.

The importance of these investment areas is very high for Romania as it is necessary a rapid recovery of the gaps registers in relation to the EU countries. With the exception of the internet infrastructure[29], where Romania does not need an update, but ensuring access for all categories of citizens, all other priorities identified at the level of the European Union are also national priorities.

The Digital Agenda for Romania 2020 is elaborated based on 4 areas of action as follows:

1. e-Government, Interoperability, Cyber Security, Cloud Computing and Social Media - an area that aims to increase efficiency and reduce costs in the public sector in Romania by modernizing the administration;
2. ICT in education, health, culture and eInclusion - an area aimed at supporting these technologies at sectoral level;
3. eCommerce, research-development and innovation in ICT - a field that aims at Romania's regional comparative advantages and supports economic growth in the private sector;
4. Broadband and digital infrastructure services - an area aimed at ensuring the conditions of access to ICT and Internet equipment, to increase digital literacy and improve digital skills.

The needs identified in the South-East development region are in line with national and European ones, the latter being forced by the ongoing COVID 19 pandemic context. Although at European level the priority of digital transformation and achieving climate neutrality has emerged in recent months, for Romania, and especially for the South-East region, these are areas that need improvement for a long time. The data from this analysis show that since 2014 the region has been performing poorly, and the progress made in recent years has either been insufficient or lacking and has led to even larger gaps than the rest of the regions. Recovering from these gaps is very important in order to be able to support the intelligent development of all areas, but especially those that are a priority for smart specialization.

In what concerns the companies, the situation differs depending on the digitization segment analyzed. Thus, even if regional data are lacking, the national situation provides an important perspective on the needs and dynamics of the entrepreneurial environment.

The digital technologies offer companies the opportunity to grow organically, participate in innovation and expand their market. The fourth component of DESI, Digital Public Services, also captures the integration of digital technologies in the business environment through 4a-Digitalization of the business environment and 4b e-Commerce. Overall, these two values place Romania at the end of the ranking, being in the group of states that have accumulated less than 35 points.

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[29] https://www.fastmetrics.com/internet-connection-speed-by-country.php#median-internet-speeds-2020, according to the latest measurements, Romania is in the first quarter of the ranking, with a fast internet connectivity.

Figure no. 104. Digital Economy and Society Index (DESI) 2020, integration of digital technologies
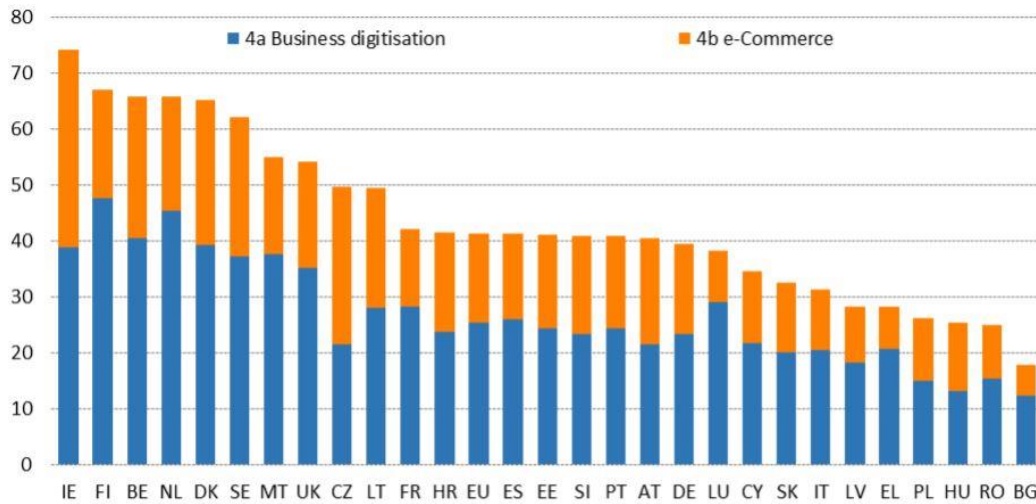
Soruce: European Commission, 2020

Moreover, although there are many investments to be made in the digitization process, the Romanian business environment has not invested according to needs. Thus, as can be seen in the following graph, Romanian companies have a very low level of the Digital Intensity Index (DII). The digital intensity consists of 12 digital technologies for which companies must have access: internet for 50% of staff, access to ICT specialists, fast internet bandwidth (30 Mbps or more), mobile internet devices for at least 20% of employees, a website, a website with sophisticated functions, social media, payment for internet advertising; purchasing advanced cloud computing services; sending electronic invoices, eCommerce turnover representing over 1% of total turnover and business-to-consumer (B2C) web sales of over 10% of total sales.

Figure no. 105. DESI (% enterprises), 2019
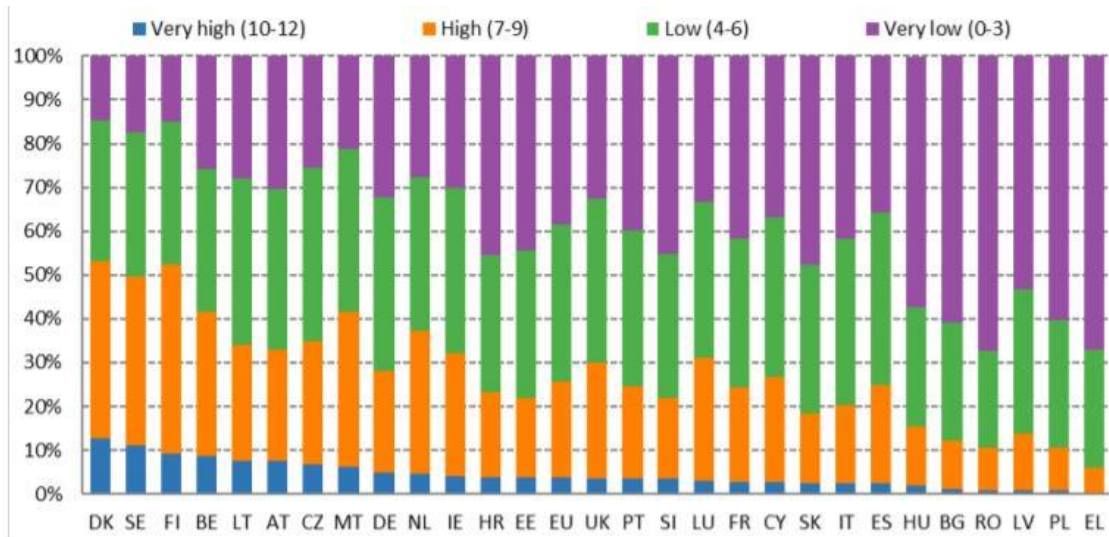
Source: European Commission, 2020

In terms of integrating internal processes, the digital transformation has been a success for companies that have addressed this element in time, as can be seen in the graph below that this has happened in states which now have a high digital intensity index and very high for 50% of companies (Denmark, Sweden, Finland). Thus, some states recovered the disadvantage in 2015 and 2017 (such as Germany, the Netherlands, Lithuania, Cyprus) where the rate of integration of internal processes was a priority for companies, and others managed in 2019 to reduce the difference (France, UK). However, there are economies based on enterprises for which the integration of internal processes is still ensured, that of Romania being one of them, together with Bulgaria and Hungary.

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Figura nr. 106. Integration of internal processes within enterprises, 2014, 2015, 2017, 2019.
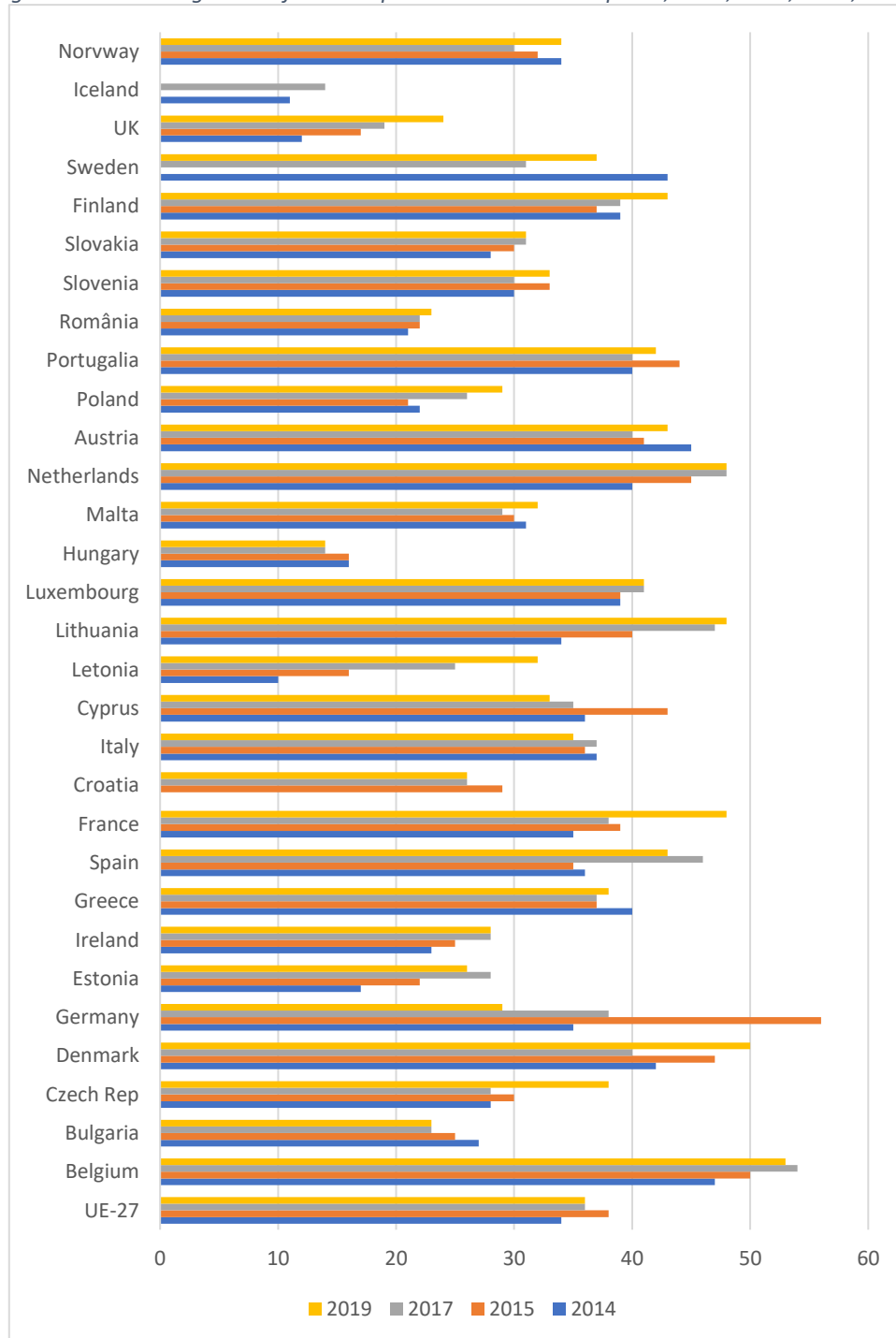
Source: data processing Eurostat, 2020

The turnover obtained from eCommerce, as a percentage of the total turnover, is one of the indicators for which the Covid-19 pandemic situation will generate different data than in previous years. The potential of online commerce will be able to be analyzed once the data is available, given that restrictions have changed the behavior of consumers and service providers. An increase in this indicator is expected for all EU countries by 2020, with the acceleration of digital transformation being one of the few positive effects for businesses that have had the resources to implement it. For the analyzed period, 2014 - 2019, the Romanian enterprises registered among the lowest values of the percentage coming from online trade from the total turnover. Cyprus, Bulgaria, Greece and Latvia, along with Romania, are the only EU countries that have recorded values lower than 10% for this indicator. It can be seen in the chart below that in 2019 there were only 3 states for which these values exceeded 30%, the European average being quite low - 18%.

Figure no. 107. The value of online commerce from total sales, 2014 - 2019
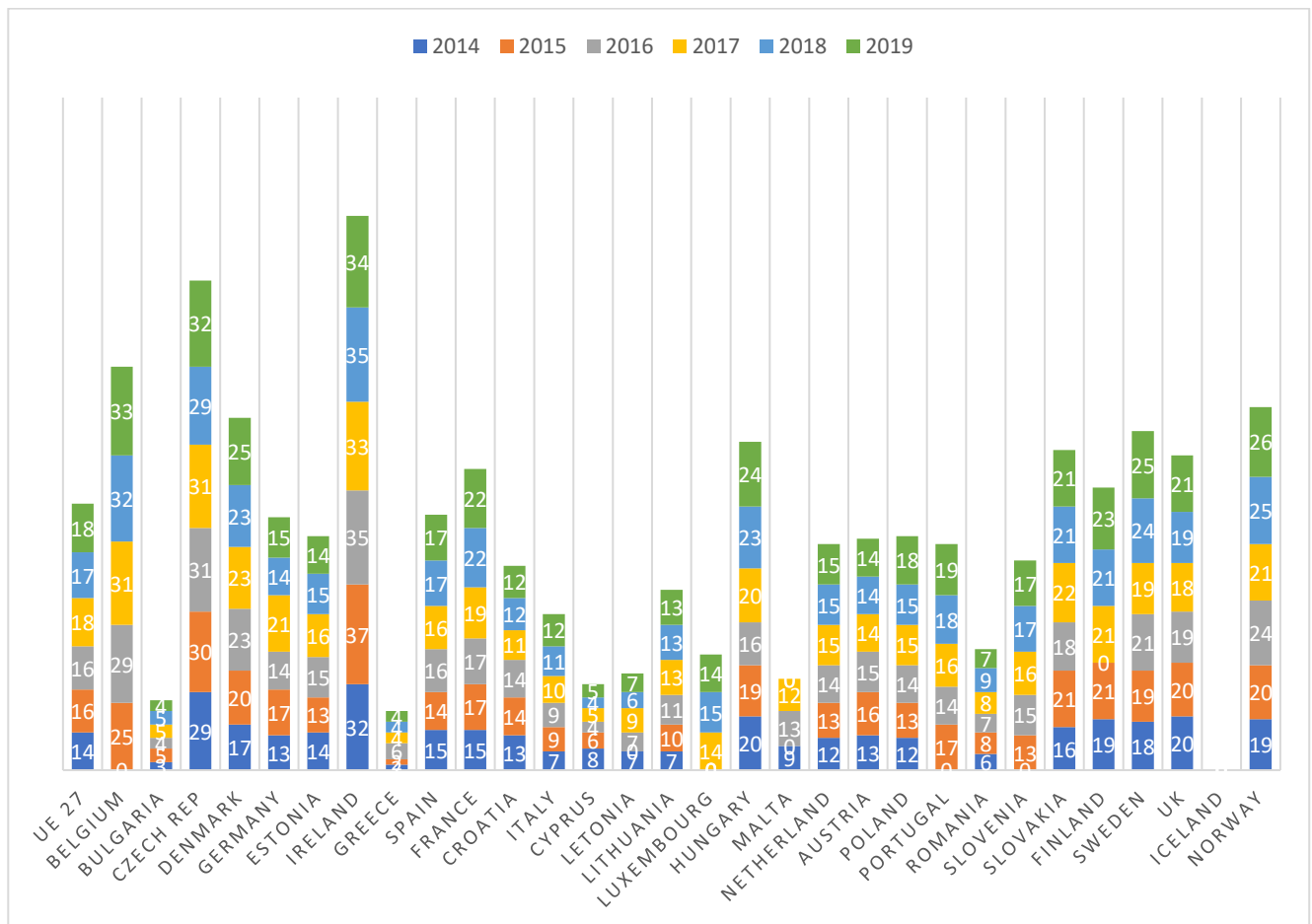
Source: data processing Eurostat, 2020

The EUROSTAT indicator, which shows the percentage of employees who use computers and the Internet at work, is very relevant, thus providing an overview of the workforce and its dynamics. For most states there has been a steady increase in the value of this indicator, with the exception of Greece and Spain for which it has remained relatively constant, and Romania and Slovenia which have seen a decline in the percentage of employees using computers and the internet instead. for work.

Figure no. 108. Computer and internet use by employees, 2014 - 2019
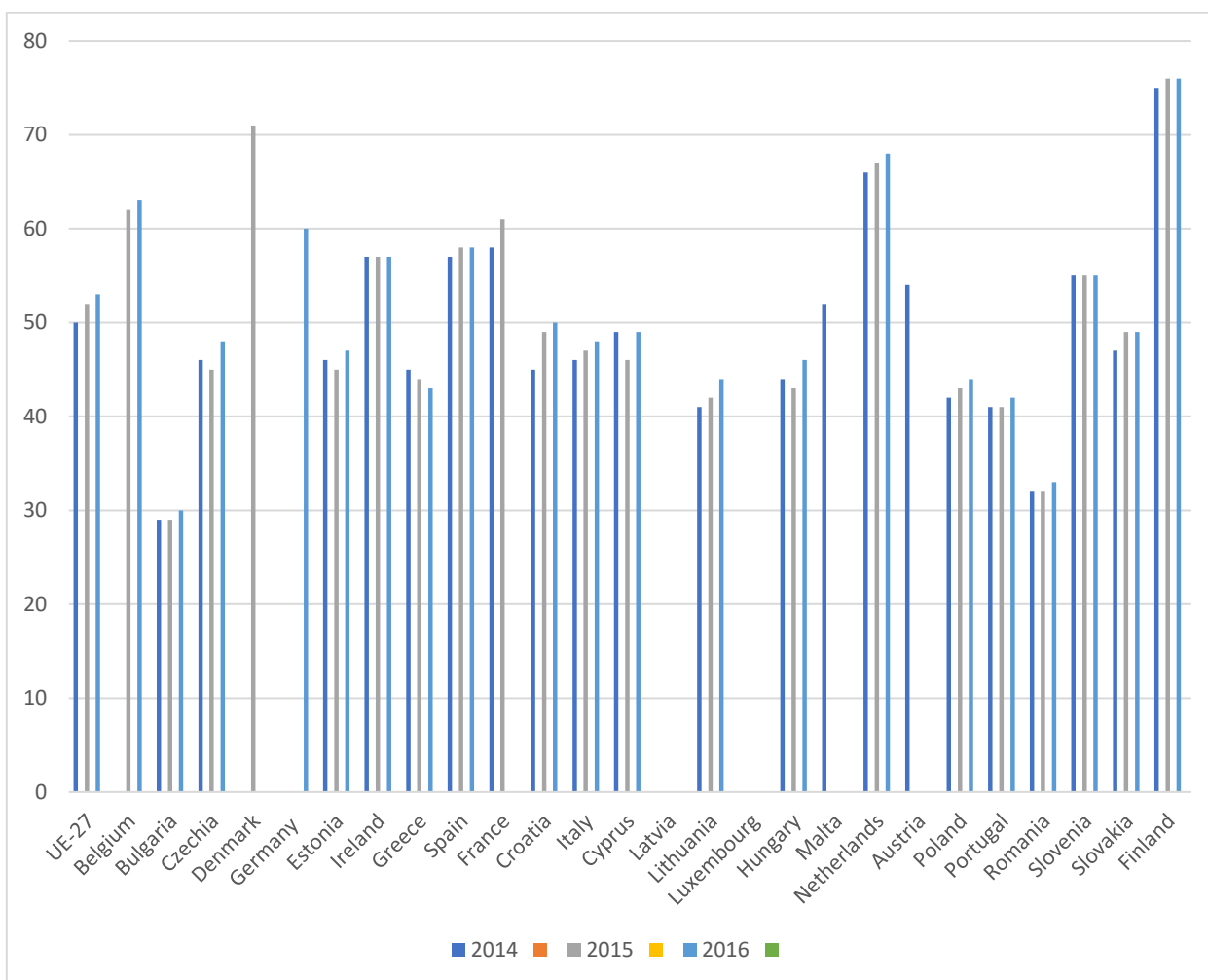
Source: Data processing - EUROSTAT, 2020

The use of social media platforms for business purposes also reveals the ability of companies to adapt to new technologies and ways of communication. Also, companies that have managed to use these new tools to their advantage, have broadened their horizons for partnerships and entered new markets. Thus, the following graph shows the percentage of companies that used social media for the following purposes: ordering/booking online, developing the company's image or promoting new products,

questionnaires addressed to customers, customer involvement in product / service innovation, collaboration with public or private partners. It can be seen that Romania is in the group of states where companies have used the services used by the online platforms mentioned only in a small percentage, below 30%. The average percentage at EU level is 43%, countries such as Malta, Cyprus, Denmark, Finland being those that exceed 60%.

Figure no. 109. Use of social media platforms for commercial purposes, 2015, 2017, 2019.
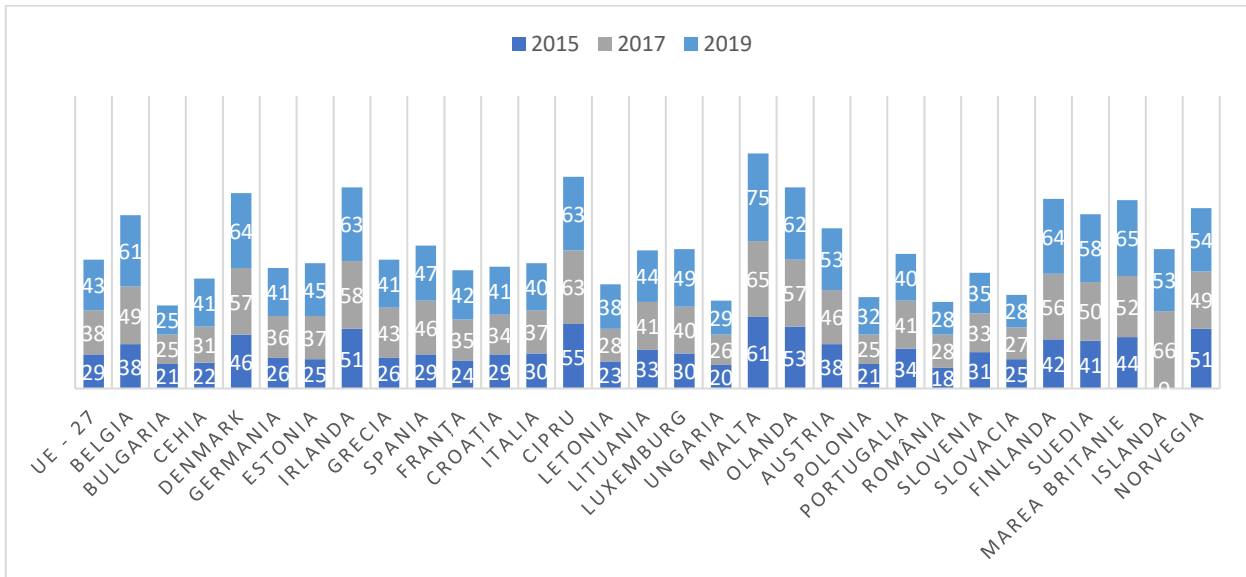
Data for cybersecurity are very limited, not existing at European level before 2019. Therefore, the evolution cannot be measured and the dynamics for this component of the digital transformation cannot be understood yet. You can see in the following graph the incipient situation, namely the percentage of companies that have applied until 2019 measures such as authentication with a strong password or periodic updating of the software used. The average number of EU companies that have implemented such cyber security policies is 76%, with most companies belonging to Finland, Malta, the Czech Republic, Germany, while the countries with the lowest percentage of companies that have taken online protection measures are Greece, Estonia and Romania, the latter being well below the EU average with a percentage of 53%, being, in fact, on the last place of the ranking.

Figure no. 110. Percentage of companies applying advanced cyber security measures, 2019
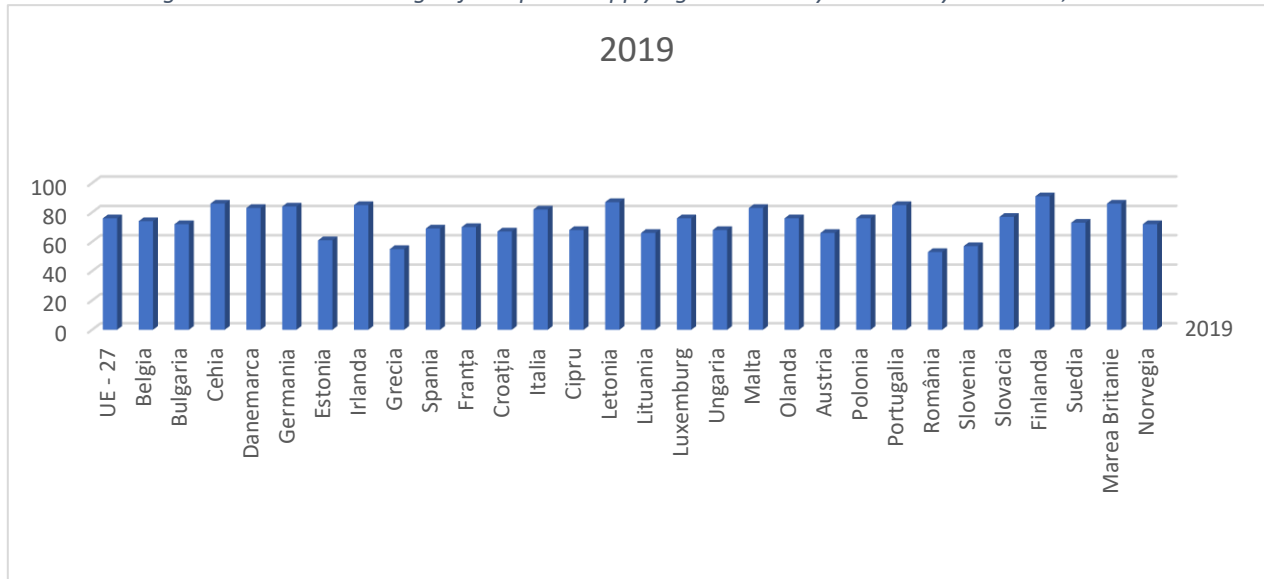
Source: Data processing - EUROSTAT, 2020

Digital Innovations Center (DIH - Digital Innovation Hub)

The Digital Innovation Center (DIH) is a legal entity created to fulfill the tasks of providing access to technological expertise and experimental facilities, such as IT equipment and tools to enable the digital transformation of enterprises.

DIHs contribute to the diffusion of digital capabilities in the regional economy, enabling digital innovation, with a focus on the priorities of the regional smart specialization strategy. Their role is to support companies in their digital transformation by providing testing facilities (experimentation with new digital technologies), skills and training, investment support and networking in a digital innovation ecosystem.

Thus, the services offered by an IHL may include:

- training and support in the acquisition of digital skills: digital innovation centers promote, host or offer training courses and internships;
- test before invest: digital innovation centers promote, provide or provide access to expertise in the field of digital transformation, know-how and services, including testing and experimentation facilities. Given the key technologies promoted by the Digital Europe Program (HPC, artificial intelligence and cybersecurity), IHLs should provide support in particular for testing and implementing such technologies;

- investment identification support: European digital innovation centers support companies, organizations and public administration institutions to become more competitive and to improve business models with the help of new technologies. The services provided may include: understanding of business opportunities, support in the preparation of business models and financial arrangements, facilitation of relations with financial institutions and investors, support in the use of various financing mechanisms, etc.
- modernization of public administrations and services through digital means, interoperability of public services; compliance with the Principles of the Tallinn Declaration on eGovernment; support for public administration to improve cyber security
- application of agreed standards and open source solutions , access to government platforms or shared infrastructures;
- the use of Artificial Intelligence and Blockchain for real-time policy making.

At the level of the South-East Region there are 3 digital innovation centers; CiTyInnoHub in Constanța, Danube DIH in Galați and Digital Innovation Hub South East Romania. These entities support companies in the digital transformation, offering testing facilities, skills, training, etc. In the next period , through investments ROP SE 2021 - 2027 and the Digital Europe Program , IHLs will become essential entities to link research- development-innovation and the private environment. Thus, the digital transformation of companies will be supported, followed by IHLs to develop both the infrastructure and human resources needed to support companies' activities.

Social innovation in the South-East Region

According to the Social Innovation Guide developed by the European Commission, the concept involves the development of solutions (products, services, models, markets or processes) that can simultaneously address a social need (more efficiently than existing solutions), leads to the development of new capabilities and relationships. or improved and make better use of existing assets and resources[30].

Social innovation therefore involves new practices, which are usually bottom-up initiatives . In order to qualify as a social innovation, certain criteria must be applied in order to evaluate the new practices developed:

- Novelty of the idea: in relation to the user or beneficiary, its context or application, not being essential the novelty of the idea, but rather of the way or context of application;

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[30] European Commission (2013): The Guide for Social Innovation.

- The social character of the intervention and the possibility to produce change: the proposed solution must target and involve the target group and must also produce a social, cultural, normative or regulatory change of the society.

- Sustainability of the implementation: the solution demonstrating its applicability after its implementation, respectively its effectiveness after its acceptance by those concerned;

- Notable impact: the efficiency of the solution depends on the tangible, real and sustainable nature of the changes generated, respectively on the potential of replicability and extension of the application of the solution.

Social innovation therefore envisages the development and implementation of new ideas for products, services or models of social organization, designed to respond to new social, territorial and environmental requirements and challenges, such as the exclusion and discrimination of minority groups, barriers to access social services, growing economic disparities, youth unemployment, climate change, etc.

The European Commission, through the European Social Fund, has promoted social innovation at the level of the 2014-2020 programming period in all areas that can be included for this purpose, especially considering the testing, evaluation and extension of social solutions both locally and and regionally in order to address social needs in partnership with the most relevant key actors. One of the forms of support in the development of social innovation solutions focused on social entrepreneurship .

The social economy, as a broader concept, is the type of economy that effectively combines individual responsibility with collective responsibility, in order to produce goods and / or provide services, aiming at strengthening economic and social cohesion at community level, employment employment and the development of social services[31]. According to the national regulations in force, the concept of social entrepreneurship brings together a wide range of actors including associations and foundations, mutual aid houses, agricultural companies, cooperatives and any other categories of legal persons that respect the principles of the social economy.

At the level of the 2014-2020 programming period, through the Human Capital Operational Program (POCU)[32]. Approximately 20 million Euros have been allocated to support social economy enterprises through training, counseling, capacity building, adaptation of jobs for people with disabilities, transfer of know-how, development of partnerships, etc. and another 30 million Euros for the establishment of social enterprises.

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[31] Law no. 219/2015 on the social economy.
[32] Mainly on the basis of the call "Strengthening the capacity of social economy enterprises to operate in a self-sustainable manner", respectively the call "Support for the establishment of social enterprises in rural areas".

At the level of the South-East Region , until the development of this study, based on POCU were allocated about 158 million RON, being supported 13 entities (representing NGOs, micro-enterprises, small enterprises and chambers of commerce). Regarding the support for the establishment of new social economy entities, given that there are still active lines of financing in order to understand on the one hand the impact of the support provided for the development of this type of entities, as well as to be able to quantify the social impact generated by them requires a detailed analysis at the end of the current programming period.

Conclusions

The low innovation capacity of the economy is one of the main factors contributing to maintaining a limited competitiveness in the South-East Region . Digital technologies are indispensable for economic development and smart specialization, and the research-development and innovation activity is underfunded, so that the needs were covered by POSCCE 2007-2013, POC 2014 - 2020 and ROP 2014 - 2020:

SEP at the level of the SE Region : 13 projects, most of them aimed at ICT interventions at the level of SMEs.

PNCDI III: Research bodies in the South-East Region have received funding and investments in research in national areas of smart specialization.

PA 1 ROP 2014-2020: required specific measures to ensure mandatory minimum conditions.

AP2 within the ROP : one of the axes with the best results because it responded to the needs of companies. The clusters acted as a catalyst and significantly contributed to the configuration of the quadruple helix regional partnership , to the subsequent dissemination of information and knowledge acquired through active participation in entrepreneurial discovery processes.

Lagging behind regions initiative (coord. JRC, funding DG Regio): methodological support, courses, etc. for improving the functioning of EDP and training potential project beneficiaries through JRC, call for projects under OS 1.2 of the ROP, for projects with multisectoral approach, support for the design and implementation of financing a new type of project: proof of concept, through the World Bank, interventions which will continue during this period.

ROP 2014-2020, PI 1.1, SO 1.2 : funding of initiatives resulting from the entrepreneurial discovery process that brought together both research and transposition of research results.

World Bank, " proof of concept" : capitalizing on the research offer and stimulating the demand for innovation.

However, the research-development-innovation activity is very poorly funded, and the lack of progress in this regard leads to deepening inequalities between regions. There is a need for digital transformation of companies that can only take place through external financing and external aid. Thus, the entire economic growth is closely related to this capacity of the actors in the field to collaborate for technology transfer, research activities, marketing of products developed with new technologies.

In order to achieve the specific goal of *developing research and innovation capacities and adopting advanced technologies* , massive funding is needed as the regional innovation environment is modest and fragmented, and cooperation between the private and public sectors is not sufficiently developed to produce measurable results. in economics. The actions supported in 2021 - 2027 through the SE ROP will be those that involve innovative activities, carried out by SMEs, in order to demonstrate the functionality of a concept that can be put on the market (*proof of concept*). Also, in order to achieve this objective, projects with a multidisciplinary approach will be supported, which aim at placing the research results on the market, the emphasis being on public-private cooperation. Smart specialization is also covered at the level of SMEs, as well as supporting technology transfer.

From the analysis of the data at national level on the IT infrastructure of the Romanian companies, a disadvantage is found for all fields, both for the hardware and for the software component. The digital transformation of companies has effects on all areas of life as it changes both the way we work and the place or devices from which work can be done. Greater flexibility is added for both employees and employers, contributing to increasing the quality of personal life, not just the professional one.

The IT sector has experienced accelerated growth at both national and regional levels. The solution to successfully implement information and communication technologies in the fields of smart specialization is to support digital innovation centers (IHL). At the level of the South-East Region there are 3 digital innovation centers; CiTyInnoHub in Constanța, Danube DIH in Galați and Digital Innovation Hub South East Romania. These entities support companies in the digital transformation, offering testing facilities, skills, training, etc. In the next period, through investments ROP SE 2021 - 2027 and the European Digital Program, IHLs will become essential entities to link research- development-innovation and the private environment. Thus, the digital transformation of companies will be supported, followed by IHLs to develop both the infrastructure and human resources needed to support companies' activities.

An important development is also desirable at the level of public administration as the technologies allow a better management of resources, a more efficient communication, the result being a greater satisfaction of the citizens in relation to the administration. Only large cities have implemented public transport computerization, but not all, and the need for funding in this regard remains high.

I.2. Connections / relations with the rest of the world and the region's position in the European Union / global economy

The objective of this section is to explore the competitive position of the South East Region based on a comparative analysis with other areas in the European Union in order to identify potential benefits that the region could exploit in the future and to identify examples of good practice. which could be emulated. In this sense, the starting point will be the methodology developed by the European Commission for the comparative analysis of regions - based on the assessment of structural similarities . At the same time, in selecting the regions for comparative analysis, certain specificities of the South-East Region will be considered that may have an impact on the development potential - eg: maritime region profile, absence of capital in the region as a development pole.

Comparison group selection

Starting from the methodology related to the development of benchmark analyzes between different European regions, methodology developed based on a multidimensional approach, at the level of the selection group selection process will be considered the following indicators identified as significant in establishing common structural conditions:

- The level of urbanization reached, the degree of population aging and multimodal accessibility (indicators targeting the geo-demographic characteristics of the regions);
- The share of the population following the secondary or tertiary higher education cycles (indicator that reflects the educational profile specific to a region);
- Technological distribution and technological concentration (aggregate indicators that follow the level of technological specialization specific to a region);
- Sectoral distribution of the economy, sectoral concentration, industrial sectoral structure, average size of local economic operators, openness to trade (aggregate indicators following the economic profile of a region);
- Degree of decentralization, social and institutional capital and entrepreneurial / innovation-oriented attitude (aggregate indicators that follow the institutional profile and values specific to a region).

Based on these indicators and using the tool for identifying regional structural similarities provided by the European Commission, the following regions that share similar structural characteristics to the South-East Region have been identified on the basis of the "distance index". regions at country level to ensure a higher degree of diversity):

Country	Region	Distance index
Romania	Center	0.0161
	South Muntenia	0.0164
Poland	Podlaskie	0.0238
	Lodzkie	0.0297
Bulgaria	Yuzhen tsentralen	0.0277
	Yugoiztochen	0.0300

In order to further diversify the comparison group, 3 other development regions were included, selected on the basis of:

- Close values reached in 2019 for the regional innovation index, respectively for the regional competitiveness index;
- Common geographical and political elements (less developed regions[33], not including the country's capital, maritime regions).

Country	Region	Regional Innovation Index (2019)	Regional Competitiveness Index (2019)
Croatia	Jadranska Hrvatska (Less developed region) - maritime area	Modest innovative profile	• 0.79
Greece	Anatoliki Makedonia Thraki (Less Developed Region) - maritime area	Moderate innovative profile	• 1.45
Italy	Calabria (Less developed region) - maritime area	Moderate innovative profile	• 1.11

A first starting point in the analysis of competitive advantages will be the composite index of regional competitiveness, which aims to analyze the quality of the institutional system, the degree of

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[33] Established within the Decision no. 2014/99 / EU, available at: https://eur-lex.europa.eu/legal-content/RO/TXT/HTML/?uri=CELEX:32014D0099&from=EN.

macroeconomic stability, the degree of development of regional infrastructure, the situation of health services, the situation of the basic education system. structural indicators), the situation of the higher education system and continuing education, the level of efficiency of the labor market, the size of the market (representing efficiency indicators), the level of technological training, the level of maturity of the business environment and the level of innovation (representing efficiency indicators) .

Considering on the one hand their relevance in developing the competitive advantages, as well as the availability of data at regional level, the comparative analysis will focus on tracking the progress achieved by the regions included in the analysis group, assessing the evolution of aggregate indicators related to the Regional Competitiveness Index. .

Figure no. 111. The evolution of the score for the Regional Competitive Index (2010 - 2019)
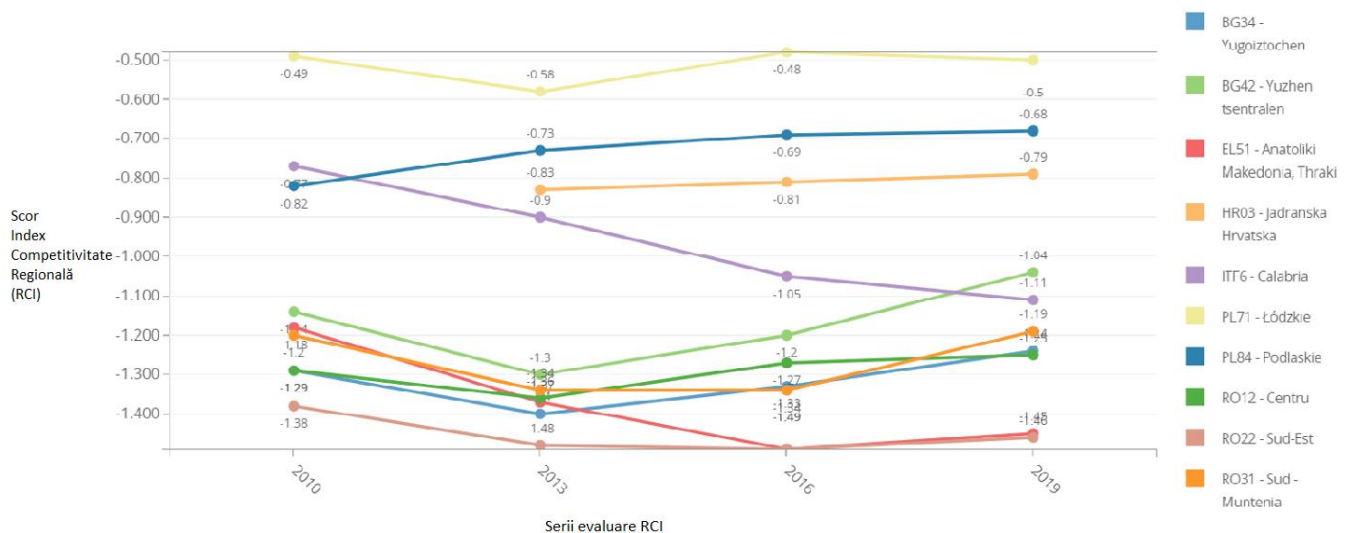
Source: data processing from the European Commission, European Regional Competitiveness Index 2019 – Time evolution (2020)

A first overview of the evolution of regional competitiveness scores indicates that the South-East Region has a steady downward trend observed mainly since 2013, placing last in the analysis group considered, followed immediately by the Region Anatoliki Macedonia. Regarding the aggregate indicator aiming at the quality of the institutional framework, the benchmark analysis indicates that at the level of the comparison group the South-East Region falls in the middle of the ranking, the quality of public services and the impartiality of their provision being low and the level of corruption. in the public sector it is still perceived as high in the region (the score in the region is -1.67 while at the national level it is 0.8). At the level of the analysis group, the Yugoiztochen Region recorded the lowest overall score in terms of the quality of the institutional framework, with the indicator of the perception of corruption in the public sector, for example, showing a lower result than at national level. The impact of the quality of

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governance on the regional economic evolution is one underlined by the specialized literature, at the level of an analysis regarding the determinants for economic resilience for example, observing that an increased efficiency and a much better defined role in the public administration society contribute positively. to ensure resilience in times of economic contraction[34].

Figure no. 112. Quality of the institutional framework (2019)
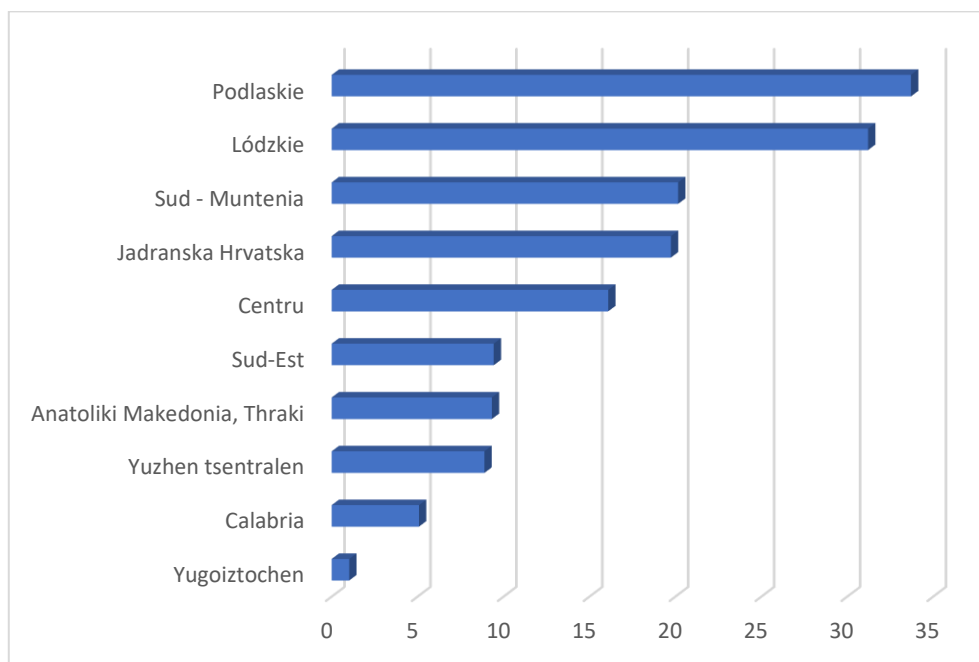
Sursa: prelucrare date agregate Indexului Competitivității Regionale (2020)

The macroeconomic stability is also an important prerequisite for competitiveness, helping to build the confidence of both consumers and producers of goods and services in market stability. Thus, stable macroeconomic conditions can contribute to higher rates of long-term investment. However, a report by the World Economic Forum on Competitiveness notes that a stable macroeconomic environment and sound government macroeconomic policies are a necessary but not sufficient premise for a prosperous economy, a mix of reforms at the micro level. being necessary to ensure economic growth[35].

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[34] F. Oprea, M. Onofrei, D. Lupu, G. Vintilă, G. Paraschiv (2020): „The deteminants of economic resilience. The case of Eastern European Regions", Sustainability Journal, Vol. 12, Nr. 10, available at: https://www.mdpi.com/2071-1050/12/10/4228/htm.

[35] R. Martin: „A study on the factors of regional competitiveness. A draft report for the European Commission Directorate-General Regional Policy", disponibil la adresa https://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/3cr/competitiveness.pdf.

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Figure no. 113. Macroeconomic stability
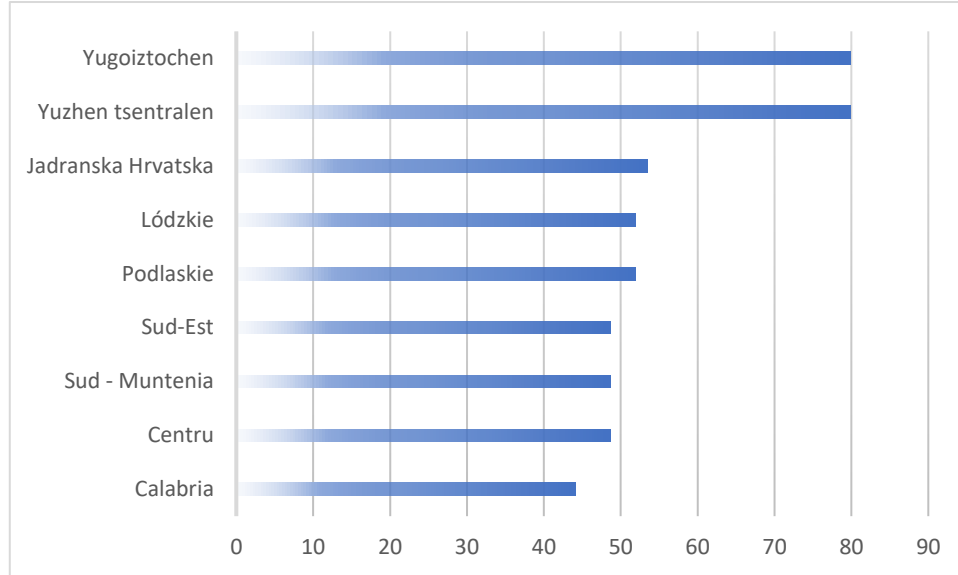
Source: processing data aggregated in the Regional Competitiveness Index (2020)

With this in mind, the analysis of the indicators calculated to establish the economic stability score[36] indicates that among the countries considered in the analysis, Italy was in 2019 in a higher position in terms of net international investment, Bulgaria recorded the largest budget surplus , as well as the most significant net government savings, while Greece and Romania occupied the first two positions in terms of government bond yields. At regional level, however, all three regions in Romania were in the lower half of the ranking made at the level of the comparison group (data are not available at regional level, but only nationally).

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[36] Namely the government surplus / debt; the level of gross national economies; yield on government bonds; position on net international investment.

Figure no. 114. The quality of the regional infrastructure
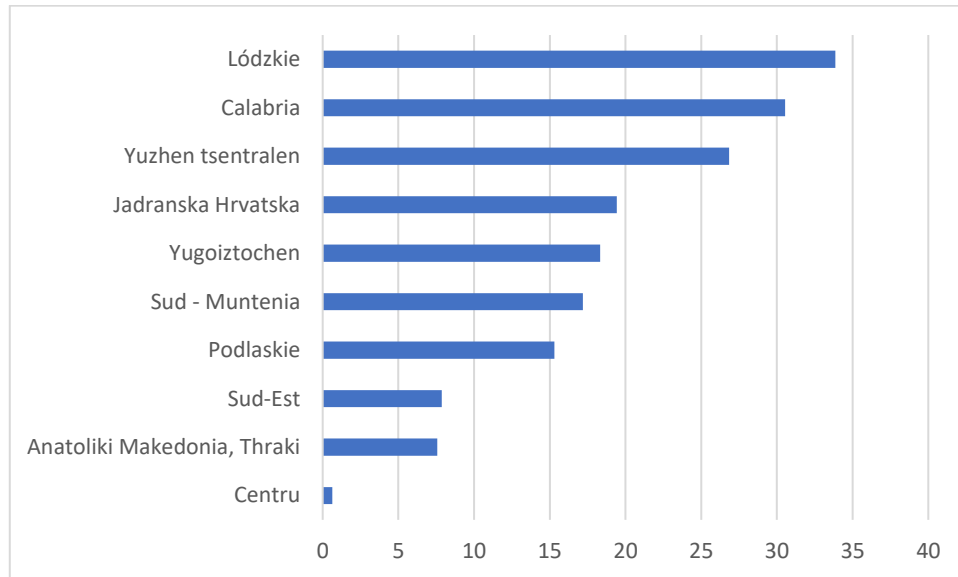
Source: processing data aggregated in the Regional Competitiveness Index (2020)

The relevance of the quality of infrastructure in relation to the level of competitiveness of a region is often underlined by the literature, determining the zonal aggregation of economic activity, influencing the types of activities and sectors that can develop in the economy, facilitating the movement of products, people and services, access of economic operators to other markets. If we compare the resulting hierarchy according to the level of competitiveness of the regions in 2019, we can see a situation almost mirrored in the case of the Southeast Regions and Anatoliki Macedonia in the ranking of infrastructure quality, which are also in the lower half of hierarchy. However, an analysis at the level of all the eight development regions of Romania indicates that the South-East Region (registering a value of this indicator of 7.86 points in 2019) ranks among the top three regions in terms of the degree of infrastructure development, after the South-Muntenia Region (with a score at the level of this indicator of 17.18), respectively Bucharest-Ilfov (with a score of 33.43).

Figure no. 115. Higher education and lifelong learning education
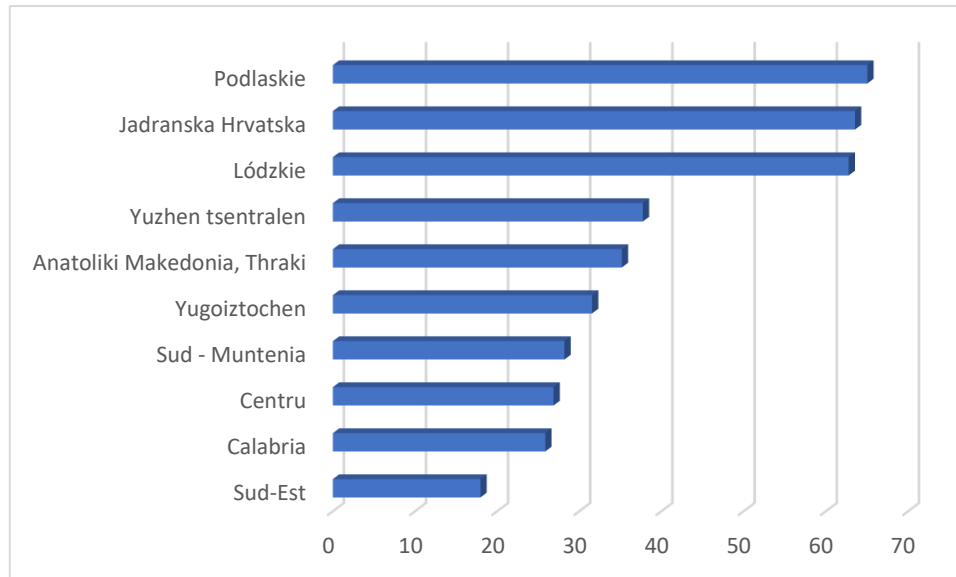
Source: processing data aggregated in the Regional Competitiveness Index (2020)

An essential premise of competitive economies is that of an educated human capital, able to adapt and trained in an educational system that has the necessary resources to facilitate the successful development of skills and competencies. A primary analysis of the situation regarding the quality of higher education and lifelong learning opportunities indicates that, at the level of the comparison group, the South-East Region is in the last place, registering the lowest share of people aged between 24 and 64 years who have completed a form of higher education (12.8%) and the lowest share of people aged between 24 and 64 who participate in lifelong learning (0.7%) . At the level of these two indicators, the South-East Region is followed by South-Muntenia and Calabria (graduating from higher education), respectively by the Central and Yuzhen tsentralen Regions (attending lifelong learning). Consideration of indicators aggregated to the Regional Innovation Index such as the number of scientific publications[37] or the number of publications most frequently cited by the scientific community[38] also indicates that the South-East Region is in the lower half of the ranking of the comparison group.

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[37] At the level of this indicator, the South-East Region has a score of 0.109 for 2019, the region in the comparison group with the highest score being Calabria with 0.374. The South-East Region is, at the level of this indicator on the penultimate position in the ranking, being above the South-Muntenia Region and below the Yugoiztochen Region.

[38] At the level of this indicator, the South-East Region is in the middle of the ranking, with a score of 0.213 in 2019, being below the Regions of Lodzkie, Podlaskie, Yugoiztochen, Anatoliki Mkedonia and Calabria (with the highest score in the comparison group of 0.535).

The Podlaskie region, which is in the top half of the ranking on higher education and lifelong learning, as well as in the rankings made for the comparison group on the number of scientific publications (including the number of most frequently cited publications)[39] brings together 8 educational institutions (Bialystok University, Bialystok University of Technology, Bialystok School of Economics and Bialystok University of Medicine, Łomża State University of Applied Sciences, Prof. Edward F. Szczepanik Vocational School in Suwałki, University of Finance and Management and School of Economics Bialystok), brings together laboratories dedicated to biology, chemistry, physics, mathematics and information technology (developed at Bialystok University), and the University of Medicine includes one of the largest university hospitals in Poland. The Lodzkie region brings together about 30 higher education institutions (including research centers of the Polish Academy of Sciences), among the most important being Universódź University (which has also developed the Center for Technology Transfer, an entity that is involved in research projects and which provides consulting services), Łódź Technical University (which also developed the Center for Business Environment Cooperation, Innovation and Technology Transfer), the Łódź College of ICT Sciences and the Łódź University of Medicine.

The Jadranska Hrvatska region brings together 10 higher education institutions, including 2 polytechnics (in Sibenik and Rijeka), the second largest university in Croatia - Rijeka University and Split University - included in the top 1000 universities worldwide. This concentration of research centers and higher education institutions at the level of these regions contributes fundamentally to achieving a higher rate of tertiary education graduates. Despite the fact that at the level of the South-East Region there are 7 higher education institutions - public and private (concentrated mainly in the municipalities of Constanța and Galați) and that at least two universities attract an increasing number of internal and external funding for the development of research projects, the analysis of the economic context indicates a significant decrease in the number of graduates of tertiary education in 2018 compared to 2014.

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[39] These indicators are aggregated at the level of the Regional Innovation Index, for 2019, the Podlaskie Region registering for the indicator of scientific publications a score of 0.265, and at the level of the most frequently cited scientific publication indicator the score of 0.249.

Figure no. 116. Labor market efficiency
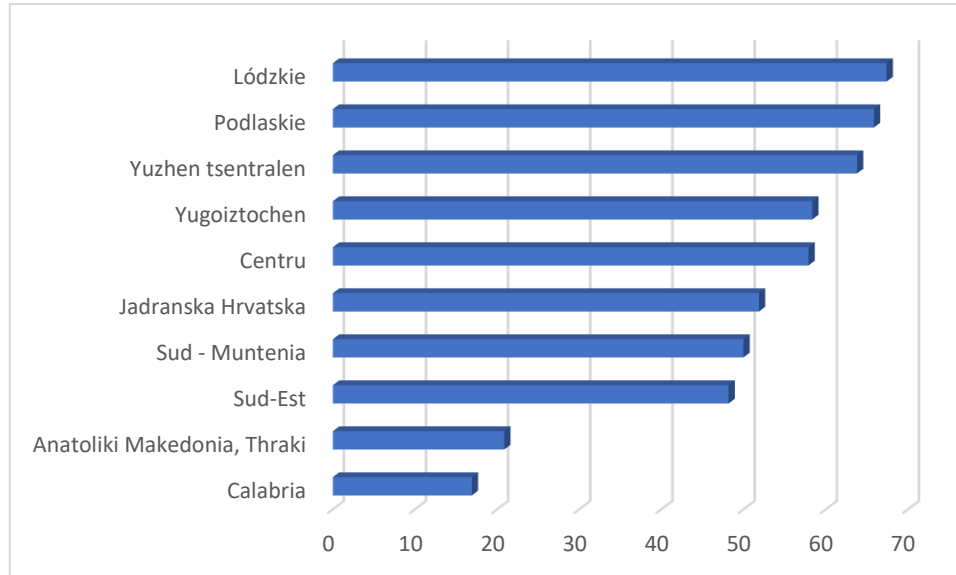
Source: processing data aggregated in the Regional Competitiveness Index (2020)

The literature[40] indicates that efficient and flexible labor markets generally contribute to an efficient allocation of resources and are an important component of regional competitiveness. At the same time, the specific indicators of the labor market indicate certain characteristics of it that influence the economic activities carried out at regional level, as well as possible existing structural problems. Thus, the analysis of both the employment rate and labor productivity are key elements for understanding the factors that influence the level of competitiveness of regions. And at the level of this indicator, the South-East Region records values that place it in the lower half of the comparison group, the relatively low level of labor productivity (compared to 2019 with a score of 49.6 and calculated as a ratio between GDP and the number hours worked) and the rather low employment rate (44.7%, not including agriculture compared to 58.6% employment rate in the Łódzkie region for example), contributing to this result. In the case of the first two regions ranked in the upper half of the hierarchy, very low long-term unemployment rates (2.2% in the case of the Łódzkie region and 2.6% in the case of the Podlaskie region), coupled with higher employment rates, reflect the picture stable internal labor markets.

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[40] Schwab, K. and Porter, M. E. (2007): The Global Competitiveness Report 2007-2008. World Economic Forum. Geneva, Switzerland.

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Figure no. 117. The size of the regional market
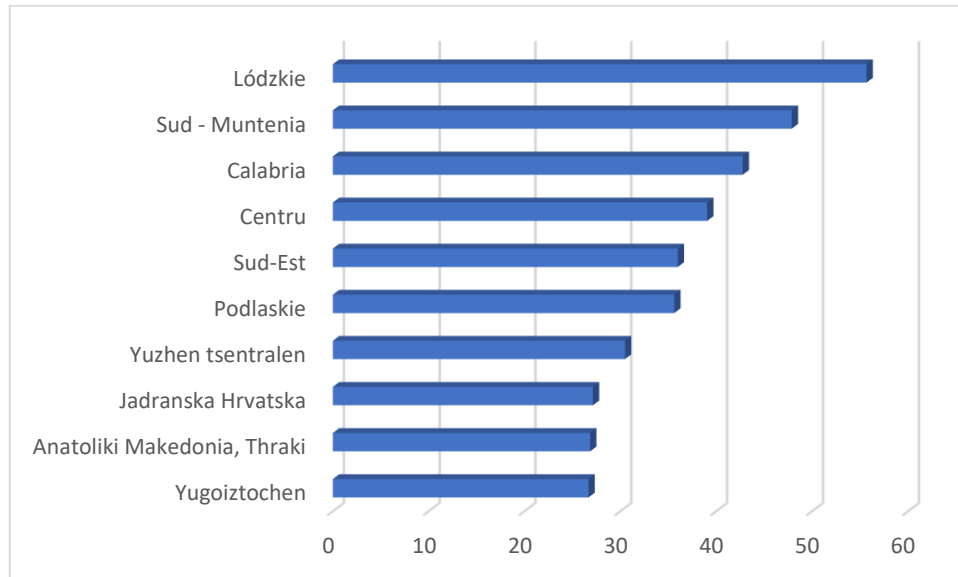
Source: processing data aggregated in the Regional Competitiveness Index (2020)

The size of regional markets is also a contributing factor to the level of competitiveness of regions, with larger markets allowing economic actors to develop and explore solutions and develop innovative products and services. The analysis of the sub-indicators aggregated at the level of this indicator reveals that the South-East Region is characterized by a low level of disposable income per capita, and the potential of the regional market size in relation to both GDP and population size is average at the level of the comparison group. At the level of this indicator, however, it can be seen that the differences between the South-East Region and the rest of the regions in the upper half of the ranking are smaller - respectively 3 points compared to the Center Region and 6.7 points compared to the Region of Calabria. The differences become more significant compared to the Łódzkie Region - by 19.6 points, respectively. However, what can be seen in this indicator is that the potential size of the market allows the South East Region to develop organically and sustainably.

Figure no. 118. Adaptability to technology
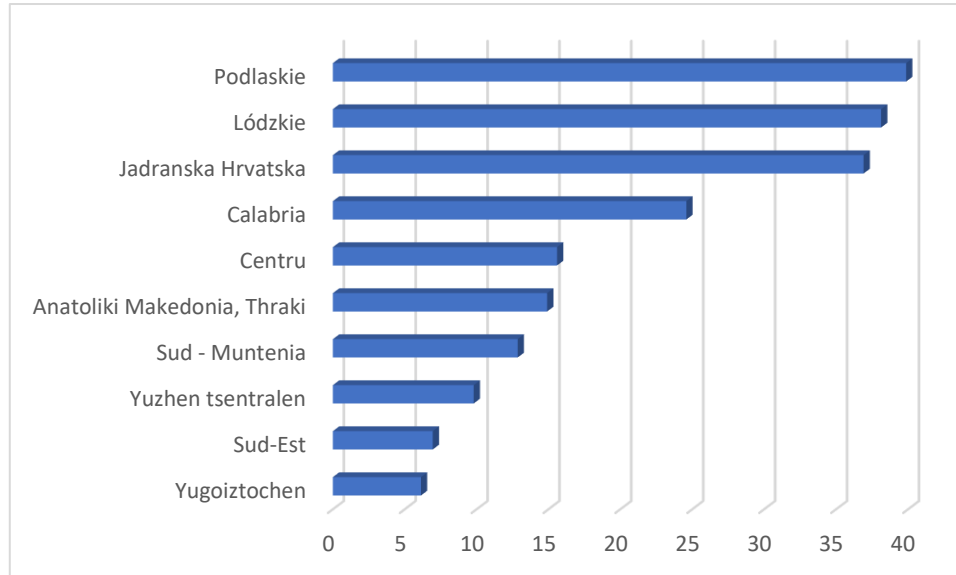
Source: processing data aggregated in the Regional Competitiveness Index (2020)

This composite indicator follows on the one hand the extent to which communication and information technology (ICT) has been integrated into the daily life of the population, as well as the extent to which - in correlation - ICT has been integrated into the activities of economic actors. The efficiency of work practices and their optimization through ICT solutions is an aspect demonstrated and reiterated both by practice and by the literature, representing an essential factor in supporting the economic competitiveness of a region or country. At the national level, Romania together with Bulgaria have similar results, the scores achieved in terms of availability of the latest technologies, as well as the degree of absorption of these technologies in companies being generally lower than in Italy, Croatia, Poland and Greece. The level of foreign direct investment and the level of technological transfer reached places Romania well below the level reached by Poland, but also by Bulgaria, these aspects being reflected even at regional level. Regarding the extent to which ICT is integrated into the daily life of the population, regional data reflect a very low degree of household access to broadband internet (the region being in last place in the comparison group), a very low level of transactions online and a generally low level of internet access. This fact translates into a low level of adaptability of the region to technology.

Figure no. 119. The degree of sophistication of the business environment
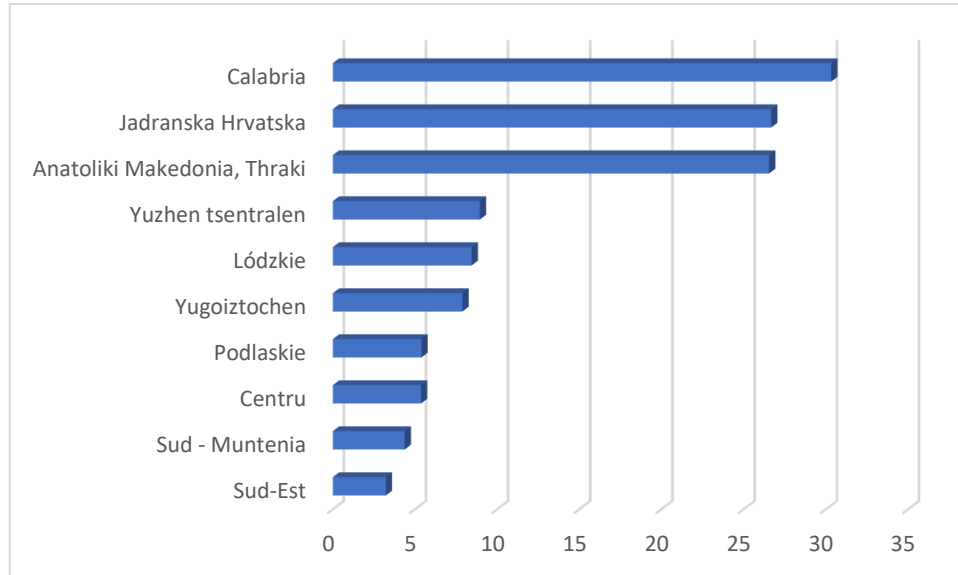
The extent to which regional economic actors can cope with competitive pressures is significantly influenced by their productivity, their specialization potential, their gross added value in key sectors (such as Communications and Information Technology) and last but not least, the ability to integrate new technologies. Considering a number of factors such as the share of innovative small and medium enterprises in the national total, the share of staff employed in key sectors (eg research and technical development activities) and the share of SMEs introducing innovative marketing and organizational solutions, South Region -East, together with the other two regions in Romania, it ranks in the lower half of the hierarchy, still indicating an entrepreneurial environment that demonstrates a low degree of sophistication.

Figure no. 120. Level of innovation, according to the Regional Competitiveness Index (2020)
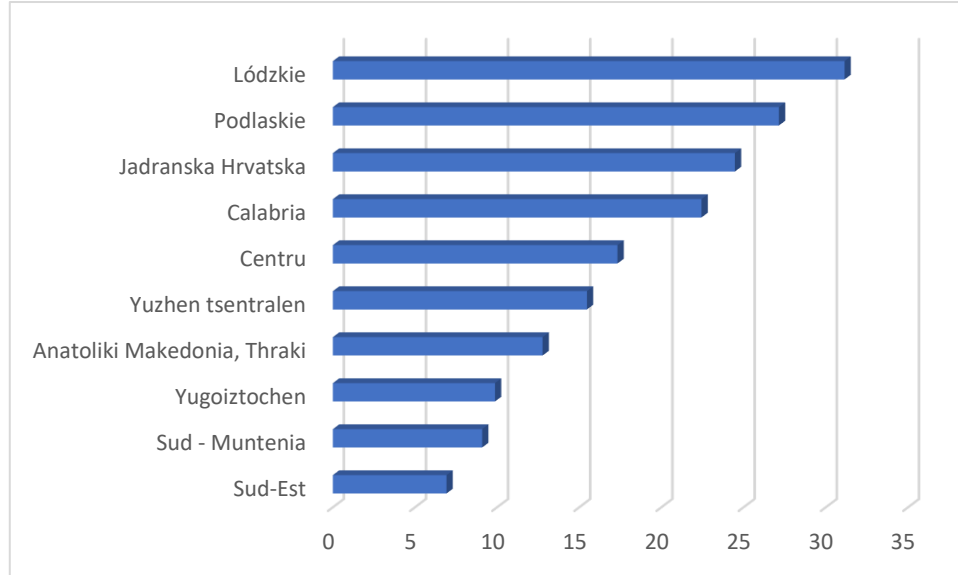
Source: processing data aggregated in the Regional Competitiveness Index (2020)

Similarly, considering a number of elements such as the share of people employed in creative fields as well as in research, the share of total expenditures for RDI, the share of people trained in fields such as Science and Technology and the share of exports from high-tech manufacturing, South East ranks last in the comparison group.

A comparison between the rest of the regions in Romania also reflects a peripheral positioning of the South-East Region, with one of the lowest shares of companies involved in RDI projects, as well as with a low number of innovative companies.

Figure no. 121. Companies involved in RDI projects (left) and innovative companies (right)
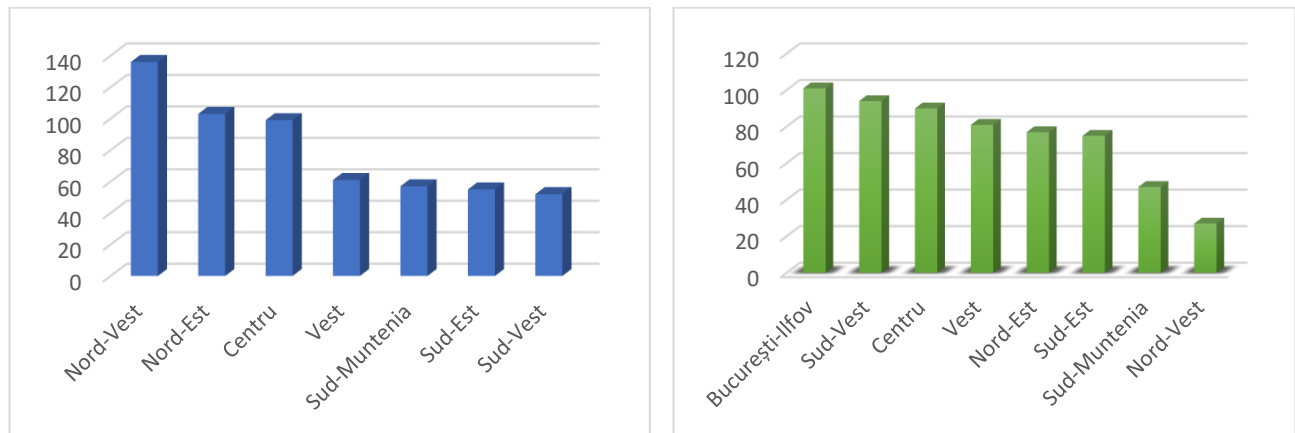
Source: processing data aggregated in the Regional Competitiveness Index (2020)

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Figure no. 122. Innovation at regional level - Comparative situation South East Region vs regional average at EU level (2019)
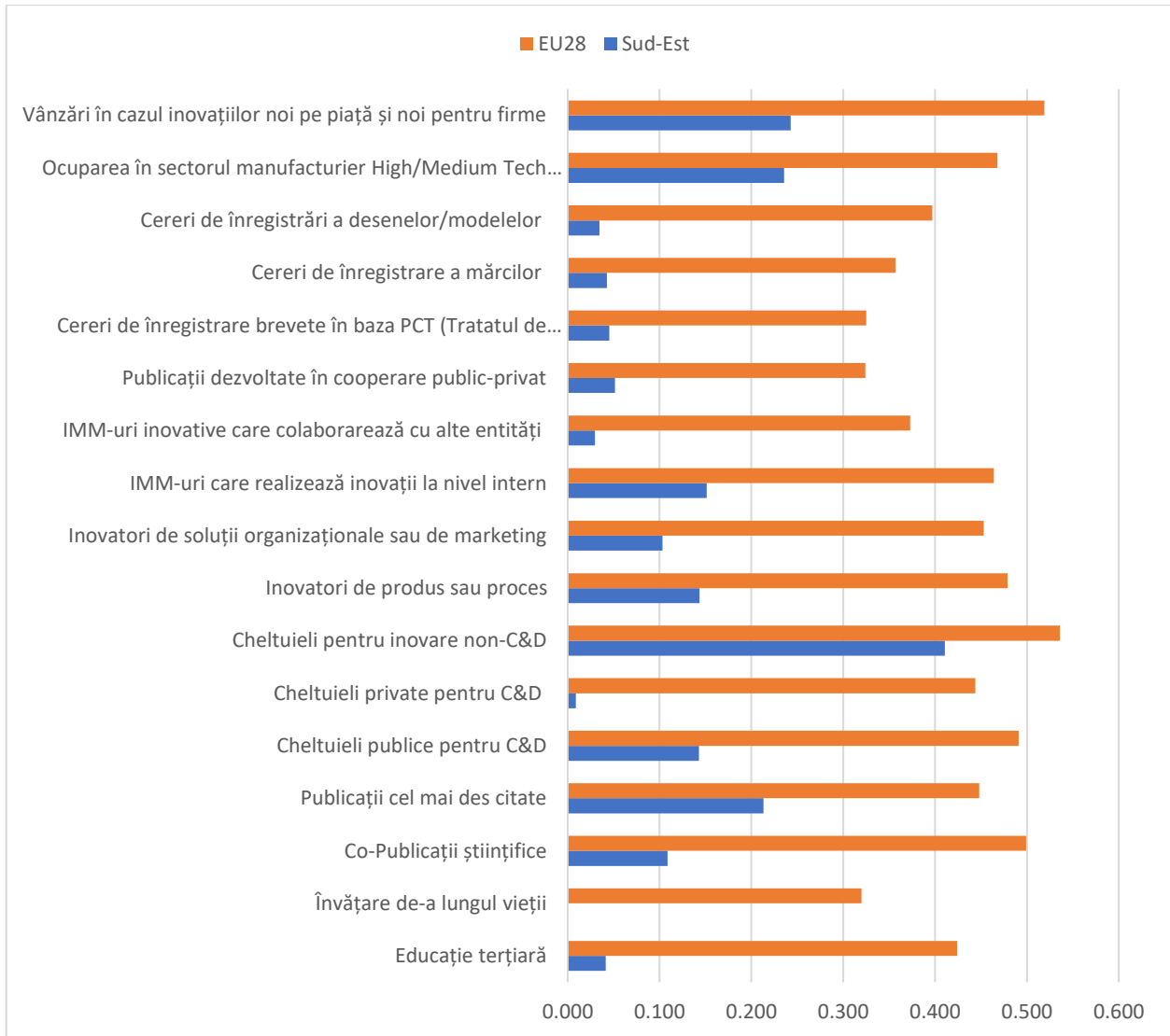
Source: processing data aggregated in the Regional Competitiveness Index (2020)

Compared to the regional average at the level of the European Union, the most significant differences are registered at the level of RDI expenditures and at the level of training and educational level reached by the population. At national level, the Regional Innovation Index for 2019[41] placed the South-East Region on the 5th place (being overtaken by the Bucharest-Ilfov, West, North West and Center Regions), being followed by the North East, South Muntenia and South West Oltenia Regions.

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[41] European Commission (2020): Regional Innovation Scoreboard 2019, available at.
https://ec.europa.eu/growth/sites/growth/files/ris2019.pdf.

A comparative analysis at national level (starting from the aggregated indicators at the level of the Regional Innovation Index), indicates the following aspects:

- The South-East region ranked last in 2019 in terms of applications for registration of industrial designs (score 7.06), the region with the next score in this indicator being South West Oltenia. Also, in terms of applications for registration of patents at the European Patent Organization (EPO), the South-East Region ranks in the lower half of the ranking, being followed - in last place by the South-West Oltenia Region.
- In terms of the labor force attracted in the manufacturing sector (based on high technology) as well as in the knowledge-based services sector, the South-East Region is also in the lower half of the regional ranking (6th place), followed by the South Regions. West Oltenia and North-East.
- Considering the indicator "Innovative SMEs in collaboration with other entities", the South-East Region is ahead of the North West, South West Oltenia, Bucharest-Ilfov, North East and West Regions, ranking 6th nationally (and reaching a score of 7.4).
- The profile configured by the indicator "lifelong learning" places the South-East Region on the last place at national level (score 0), on the first place in contrast being the South Muntenia Region, followed by Bucharest- Ilofv .
- In terms of marketing or organizational innovation, the Region differs nationally (with a score of 22.08) ranking 3rd and being surpassed only by the North East and North West Regions, respectively. Notable results are recorded by the South-East Region also in terms of the level of expenditures related to non-Research and Development innovation (the region occupying the first place at national level and being followed by the Bucharest-Ilfov Region), in terms of process innovation or product (ranking first nationally and followed by the North West and Bucharest-Ilfov Regions), respectively in terms of the number of academic publications with the most citations (the Region ranking 4th, ahead of the West , North West and North East). Finally, South East ranks first nationally in terms of SMEs that produce innovation based on internal research (or "in- house "), reflected significant results including the sales of new innovations on the market or new for manufacturing companies.
- The indicator "Population with tertiary education" places the South-East Region on the penultimate place at regional level, followed by South Muntenia.

An analysis of the ability to attract funds for the development of innovative and research and development projects, such as those offered through the Horizon 2020 program , also reflects a limited capacity of the South-East Region which is placed in the lower half of the ranking.

Figure no. 123. Funds attracted through the Horizon 2020 program
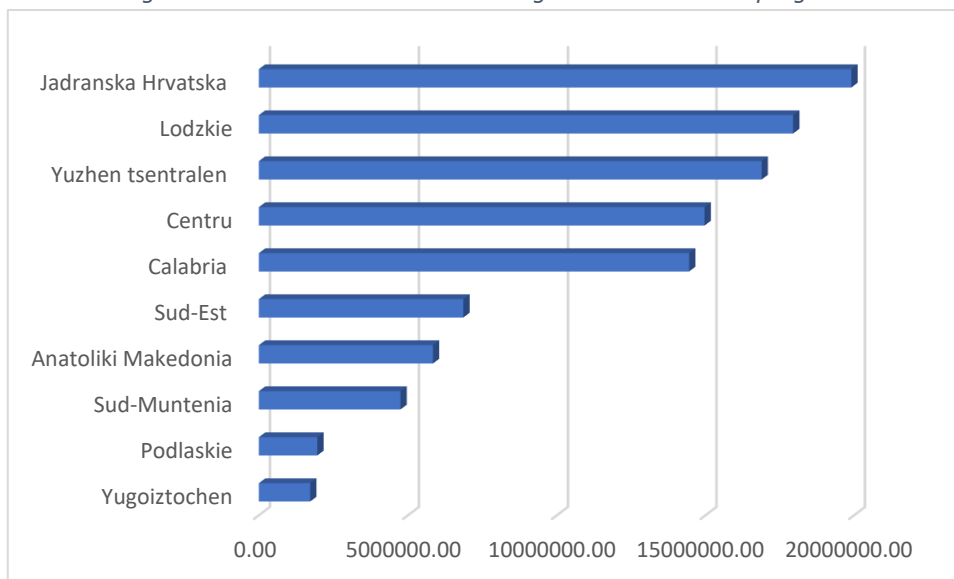
Source: European Commission (2020)

Thus, among the regions that have attracted the most funds for RDI purposes are Jadranska Hrvatska, Lodzkie and Yuzhen tsentralen. The Jadranska Hrvatska region attracted through the Horizon 2020 program a total of 19,910,000 Euros, being funded 105 grants (representing 0.34% of the total) for the development of research projects bringing together 132 participants, 42.8% of the total funding attracted going to private economic actors, 38.8% to secondary or tertiary education institutions, 7.5% to other categories of public actors and 5.9% to research organizations.

The Lodzkie region attracted 17,952,000 Euros during this period, being funded 94 grants (0.31% of the total) for the development of research projects bringing together 101 participants, 41.6% of the total funding attracted going to secondary or tertiary education institutions , 33.6% to private economic actors, 18.6% to research organizations and 5.7% to other categories of public actors. The Yuzhen tsentralen region attracted 16,890,000 Euros, being funded 47 grants (0.15% of the total) for the development of research projects bringing together 58 participants, 77.7% of the total funding attracted going to research organizations, 5.6 % to private economic actors, 5.3% to secondary or tertiary education institutions and 4.9% to other categories of public actors.

Regarding the regions at the level of Romania, the Center attracted 14,970,000 Euros, being funded 89 grants (0.29% of the total) for the development of research projects bringing together 105 participants, 45.6% of the total funding attracted going to private economic actors, 21.2% to secondary or tertiary education institutions, 14.1% to other categories of public actors and 1.9% to research organizations. The South-Muntenia region attracted 4,750,000 Euros, being funded 40 grants (0.13% of the total) for the development of research projects bringing together 50 participants, 33.7% of the total funding

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attracted going to private economic actors, 30, 2% to other categories of public actors, 11.4% to secondary or tertiary education institutions and 9% to research organizations. The South-East Region attracted 6,860,000 Euros (40 grants), out of the total of these funds 27.3% of the total funding attracted going to private economic actors, 27% to research organizations, 14.2% to other categories of public institutions (other than research and education) and 11.3% to secondary or tertiary education institutions.

I.3. Dynamics of the entrepreneurial environment; Areas of smart specialization

I.3.1. Characteristics of the entrepreneurial environment in the South-East Region

A solid economy is characterized by an ecosystem of small and medium-sized enterprises (SMEs) and startups. However, in order to develop it, it is absolutely vital that all the actors involved in its existence have a comprehensive understanding of all its peculiarities and challenges. The South-East region will not be able to get out of the unfavorable situation from the economic -social point of view in which it finds itself without a prior knowledge of the characteristics of the existing entrepreneurial environment and without a coherent plan to support it.

Globally, small and medium-sized enterprises (SMEs) are the engine of the economy. They play a vital role in the sustainable functioning of local markets, but also of the global market. They employ 50% of the total workforce globally, while in Romania they represent 66%. A distinct category of SMEs is represented by small start- up and scale- up businesses, at the beginning of the activity and which are defined by a process of accelerated growth, contributing significantly to socio- economic development by creating new jobs, increasing economic dynamism by stimulating innovation and creating new industries. A strong point of the European Union is the support of the startup ecosystem since 2017, generating revenues of over 430 billion euros (Impact Hub, 2020).

For the next funding period 2021 - 2027, European Union investments are targeted at five objectives. Investment in regional development will focus in particular on Objectives 1 and 2. 65% to 85% of ERDF and Cohesion Fund resources will be allocated to these priorities, depending on the relative prosperity of the Member States. Goal 1 brings small and medium-sized enterprises to the forefront of supporting a smarter Europe through innovation, digitalisation, economic transformation and support for small and medium-sized enterprises.

The studies carried out by the European Commission "The Romanian Entrepreneurial Ecosystem - Background Report" and "Start- ups, Scale- ups and Entrepreneurship in Romania" give us a relevant picture of the situation of entrepreneurship , startups and scaleups in our country, which is also reflected in the situation of the South-East Region.

Thus, according to the EC reports, the main problem of the Romanian entrepreneurial environment is the small number of newly created companies. The "birth rate" indicator that shows us the number of newly created enterprises compared to the number of active enterprises in 2014 was only 10.19%. According to the European Innovation Scoreboard 2020, the establishment rate of new enterprises in Romania was 2.78% in 2018, decreasing to only 2.38 in 2019.

Secondly, the survival rate of newly created companies in Romania decreased in the period 2009 - 2014 from 60% to 40%.

Thirdly, small and medium enterprises in our country are behind European SMEs in terms of capacity to innovate, Romania being a modest innovator. According to the European Innovation Scoreboard 2020, the rate of SMEs innovating in 2015, for which there are data, was only 9.59%. Moreover, Romania is far behind the countries in the European Union and in terms of the number of innovative SMEs with accelerated growth, which is also reflected in a reduced collaboration of SMEs, the indicator Innovative SMEs collaborating decreasing from 7.08 in 2017 to 6.27 in 2019. The South-East region registered in 2018 an innovation index of only 23.1, decreasing compared to previous years (in 2014 the innovation index was 28.8). Moreover, if in 2014 the indicator of the degree of collaboration between innovative SMEs (Innovative SMEs Collaborating) was 23.2, in 2018 it had decreased to only 7.9. The number of SMEs innovating in the region has not evolved positively in recent years either. If in 2014 the indicator " SMEs innovating in- house " was 53.8, in 2018 it had dropped to 31.4.

In subchapter 1.1 of the strategy, a series of aspects related to the dynamics of the activity of small and medium enterprises and entrepreneurial activity were presented and analyzed, which will not be repeated in the current analysis of the dynamics of the entrepreneurial environment in the South-East Region. However, a number of specific developments and indicators for entrepreneurial activities with an impact on the South-East Region will be presented and analyzed, in order to obtain a more complete picture, not only in terms of the dynamics of the entrepreneurial environment, but also the innovation potential existing at its level.

In the South-East Region, the total number of active enterprises increased significantly between 2014 and 2018, from 57. 888 in 2014 to 63. 232 in 2018, representing an increase of over 9, 23%. Size class in 2018, almost 90% of assets were small businesses with 0-9 employees, 8, 6% were between 10 and 49 employees, 1, 3% were between 50 and 249 employees and only 134 the company had over 250 employees, representing only 0, 2% of all enterprises.

At national level, the number of newly created enterprises increased steadily between 2014 and 2018, the creation of enterprises being supported by projects with non-reimbursable financing. From the perspective of this indicator, the South-East Region registered a significant increase in the registration of new active enterprises. If at the level of 2014 7,487 enterprises were registered, at the level of 2018 13,062 enterprises were registered, representing an increase of 42.69% in this time period.

Figure no. 124. Newly created active enterprises, at regional level, 2014 - 2018
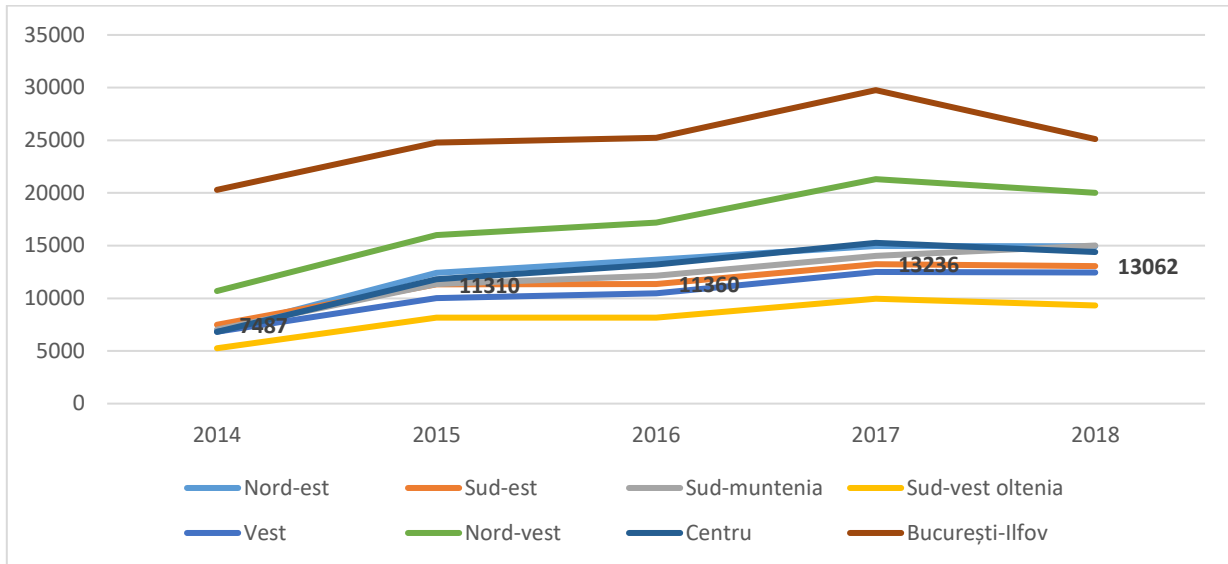
Source: data processing - National Institute of Statistics, 2020

Regarding the deregistration of companies in the South-East Region, the data from 2014 to 2019 were analyzed. Although in the period 2014 - 2016 the number of companies deregistered in the region increased steadily, in the period 2016-2018, the trend seems to be reversed. If between 2014 and 2016 the number of deregistrations at the regional level had increased by 13.51%, in the next two years the indicator registered a significant decrease. At the level of 2018, the number of deregistrations had decreased by 20.66% compared to 2016, representing an average decrease of 10.33% per year. At the level of 2019, the delisting trend had returned to growth. For 2020, the data available until August were analyzed, noting that there were 51.25% fewer companies deregistered at county level compared to the same period of 2019.

Analyzing the number of innovative enterprises by size classes, it is found that in the South-East Region, most innovative enterprises are small and medium enterprises, in 2016 (the last year for which we have data available), being 471 innovative SMEs and only 37 large innovative enterprises. However, a decrease in the number of innovative SMEs in the South-East Region can be observed by 8.73% between 2014 and 2016, while the number of innovative large enterprises (MI) decreased by 15.91% in the same period. In terms of breakdown by type of activity, companies operating in the industry are, at the level of the South-East Region, more innovative compared to companies providing services. Indeed, in 2014, companies in the industrial sector accounted for 57.67% of the total number of innovative enterprises in the South-East Region, while in 2016, their share increased to 58.26%.

The average number of employees of newly created active enterprises, by type of unit, decreased in the period 2014 - 2018 from an average of 3 in 2014 to only 2.1 in 2018. By type of enterprises, at the level of companies there are higher values than the category of individual entrepreneurs. Such a situation can be explained by the fact that in the South-East Region, more than 50% of newly established enterprises can be classified as micro-enterprises without employees.

Tabel no. 18. Average number of employees of newly created active enterprises, by type of unit, South-East Region, 2014 - 2018 (MU percent)

Unit type	Development regions	Years				
		2014	2015	2016	2017	2018
Total	South-East Region	3	2,8	2,6	2,4	2,1
Trading companies	South-East Region	3,5	3,9	3,3	2,3	2,5
Individual entrepreneurs	South-East Region	1,3	1,3	1,2	2,7	1,2

Source: National Institute of Statistics, 2020

The share of the number of employees by size class of the company has undergone significant changes in recent years. Thus, we observe a slight increase in the share of the number of employees in enterprises with 0 employees from 20.6% in 2014 to 36.1% in 2018, but also a significant reduction in the share of the number of employees in enterprises with over 49 employees to 8.5% in 2014 to only 2.3% in 2018. A special situation is encountered in 2017, when the percentage of employees by size classes of enterprises was approximately equal (~ 30%). In all other years, most employees were found in companies with 1-49 employees.

Figure no. 125. Share of number of employees, by size class of the enterprise, South-East Region, 2014 - 2018
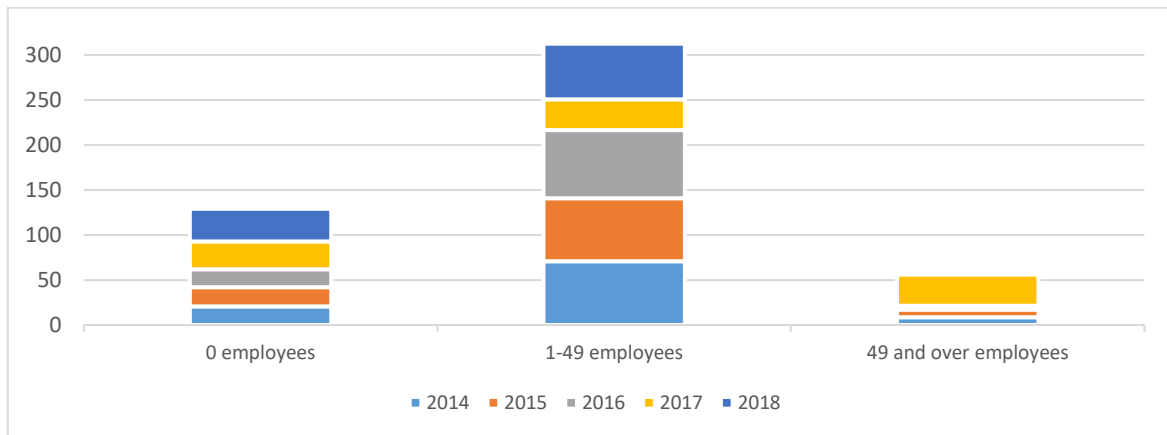
Source: data processing National Institute of Statistics, 2020

Regarding the type of entrepreneurs in South East in 2018, most were freelancers (27.469 people) and only 1.944 family businesses. Between 2014 and 2018, the number of family enterprises decreased by 18%, and that of PFAs by 5%. Galați County registered in 2018 the largest number of family enterprises (698), followed by Constanța County (398). The county with the fewest family enterprises was in 2018 Tulcea County, with only 116 enterprises. At the county level, business initiatives individual were best represented in Constanţa (8.066), followed by Buzău (4.910), Braila (4.226), Galati (4.779) Vrancea (3.721) and Tulcea (1.767). This situation is justified by the socio- economic and geographical characteristics of each county, by the degree of urban development, by the support given by the local public authorities to the entrepreneurial environment. In Constanţa or Buzău county there is a higher tourist potential, most private entrepreneurs acting as independent persons in this field of activity. From a geographical point of view, the Danube Delta Biosphere, a protected geographical area, occupies a large area of Tulcea County, so that the development potential of new businesses is much more limited than that of other counties in the region.

Figure no. 126. The type of private entrepreneurs in the South-East Region, 2018
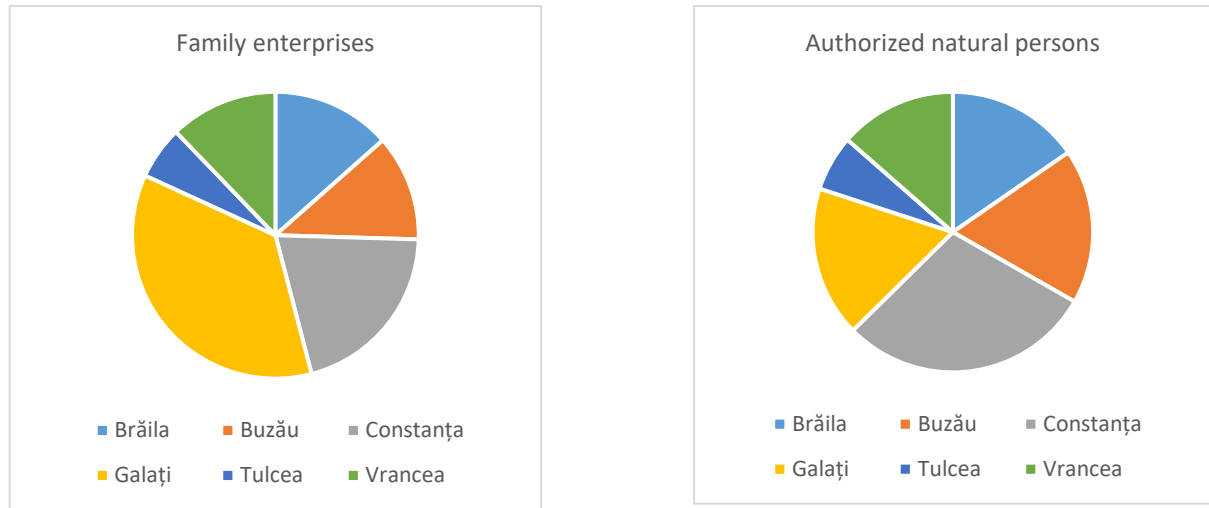
Source: National Institute of Statistics, 2020

The entrepreneurial dynamics of the region is also highlighted by the situation of the newly created enterprises one year after the establishment. Basically, a survival of at least one year suggests both the fact that the organization has solid activity and their potential to create new jobs in the future. In this sense, it can be seen that in the South-East Development Region the largest share is held by active SMEs (69.4%) but increasing in recent years and the share of inactive enterprises from 14.2% in 2014 to 25% in 2018. Only 5.6% of enterprises created a year earlier were disbanded, a significantly lower percentage in 2018 than in 2017 (12.6%).

Tabel or. 19. Situation of newly created enterprises one year after the establishment, South-East Region, 2014 - 2018, MU percent

State of the art	Development regions	Years				
		2014	2015	2016	2017	2018
Active	South-East Region	77,7	78,2	78,4	69,4	69,4
Inactive	South-East Region	14,2	14,3	13,3	18	25
Disbanded	South-East Region	8,1	7,5	8,3	12,6	5,6

Source: National Institute of Statistics, 2020

The South East Region's share of newly created active enterprises that made investments in the first year fell to 12,6% in 2014 to only 4,1% in 2018, with a minimum of 1,3% 2016. Comparatively, at national level, this share remains somewhere around 11%- 12%, the highest percentages being found in the Regions of South-Muntenia (17 , 5%), Center (15 , 3%), Northeast (14 , 2%). In fact, the South-

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East Region has the lowest share of newly created active enterprises that made investments in the first year of activity at national level. Among the most important causes that determine the occurrence and manifestation of such behavior of entrepreneurs, can be mentioned a number of issues related to lack of financial resources and access to sources of funding. We can also mention that some SMEs generate the resources necessary for subsistence. The large share of newly created SMEs in the field of wholesale is another possible explanation, as wholesale activities do not require major investments.

The dynamics of the entrepreneurial environment can also be analyzed with the help of the indicator "The share of the number of employees, by type of employment". According to statistics presented below in the South-East, patrons have the largest share, accounting for the period 2014 - 2018 increased from 38% to 55,4%. Also, the number of full-time employees is 43,6% of the number of employees, the percentage of part-time employees declined sharply by 7,8% in 2014 to 0% in 2018. A similar situation is recorded at national level and may be considered an expression of the process of development of SMEs over time and their economic and financial stability.

The profile of the entrepreneur in the South-East Region has changed somewhat in recent years, which is also justified by the national programs to support young entrepreneurs. Thus, if in 2014-2016, most business founders were between 30 and 39 years old, after 2017 began to increase the percentage of people up to 30 years old who open their businesses. Thus, in 2018, 30% of the founders of new companies were under 30 years old, 34% were between 30 and 39 years old. Also, the percentage of people over 50 who set up companies has decreased significantly, approximately 10% of the total falling into this age category. The several and entrepreneurs are men (54.9%) and 45.1% women. However, there is a slight increase in women involved in entrepreneurial activities, from 43.7% in 2014 to 45.1% in 2018.

From the point of view of professional training and studies, in 2018, the largest share of entrepreneurs is those with secondary and university education, respectively 49.2% of the total number of entrepreneurs in the region. A high percentage is also registered in the case of people with secondary education (44.3%).

The business environment and entrepreneurial performance in the South-East Region can be significantly improved in the coming years by simplifying administrative procedures, increasing the transparency and efficiency of local public administration, but also by reducing bureaucracy and corruption. Creating digital one -stop-shop services for entrepreneurs would help the entire business environment in the region. Entrepreneurial education is also of major importance. It would be very important to invite schools, entrepreneurs, pupils and teachers to join open discussions on how to change the general educational approach in order to better support entrepreneurship. Although this region has a lot of potential, the dynamics of change needed to promote a conducive business

environment is quite low. The biggest barriers to its development are a lack of trust, predictability and transparency, as well as access to finance and the limited capacity of higher education institutions to play an active role as a stakeholder in the entrepreneurial ecosystem.

I.3.2. Smart specialisation priority areas for the South-East Region
I.3.2.1. Methodology for selecting priority areas

The quantitative and qualitative analysis carried out at the level of the South-East Region highlighted the existence of priority areas with development and smart specialisation potential, aiming at concentrating financial resources and other support mechanisms on this limited number of areas and creating national and international partnerships.

When choosing the smart specialisation priority areas, 6 criteria were taken into account, as presented in the "RIS3 Guide on Research and Innovation Strategy for Smart Specialisation".

The methodology for selecting smart specialisation areas comprises four distinct steps:

a) Identifying areas with potential of smart specialisation potential, depending on the quantitative and qualitative information derived from the analysis of the regional context and innovation potential of the region;
b) Identifying areas with potential of smart specialisation following the results analysis of field research, obtained through surveys carried out among regional actors, relevant for smart specialisation;
c) Consultation of key actors relevant in the field of smart specialisation in the framework of Entrepreneurship Discovery Meetings;
d) Multicriterial analysis.

Figure 150 Milestones of the smart specialisation field analysis

Analysis	Questionnaire-based survey	Entrepreneurial discovery meetings	Multicriterial analysis:
•Quantitative •Qualitative •Identifying innovation/development actors	•Business environment •Local public authorities •Academic environment •Non-governmental organisations	•Business environment •Local public authorities •Academic/research environment •Non-governmental organisations	- importance of the field in the regional economy, — market, - intensity of innovation in this field, — availability of qualified human resources in the field

The selection of smart specialisation areas took into account regional development characteristics, from an economic, social, political, demographic and historical point of view, as well as a detailed analysis of the actors with development and innovation potential and locally relevant economic agents. Significant indicators were analysed to establish the potential for smart specialisation at national, regional and county level.

Also, the analysis of regional context resulting from the research of statistical data was complemented by the results obtained in the survey addressed to key actors in the South-East Development Region, based on the application of a questionnaire in all counties. The data collected comprises the four components of the quadruple helix: public sector, universities and research institutes, private sector and civil society.

Following the survey carried out, a set of relevant conclusions to identify areas of smart specialisation across the region has resulted[42]. In this regard, considering the responses received from representatives of the business environment, academic/research environment and public authorities consulted, the following issues emerged:

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[42]The detailed analysis of the resulting data is attached.

- The areas with the most significant development potential, from the respondent's point of view included: shipbuilding, agriculture and food industry, tourism, ICT, fisheries and aquaculture, manufacturing of synthetic and artificial fibres.
- The areas where efficient market solutions have been developed included: shipbuilding, tourism, ICT, agriculture and food industry.
- The areas considered to have the most important clustering potential included: agriculture and food industry, tourism, fisheries and aquaculture, ICT, biotechnologies, shipbuilding and the energy sector.
- The economic sectors with the highest potential for specialisation in the South-East Region included: ICT, agriculture, shipping, tourism, industry and textiles.
- Sectors of activity considered to be the most important at regional level for research, development and innovation, in terms of impact on the economic environment included: industry (especially shipping and ICT), agriculture and services (especially tourism).

Thus, correlated with the respondents' opinion, the priority areas that can be developed in the region and for which smart specialisation niches can be defined are: (1) Engineering and shipping; (2) Clothing industry; (3) Agro-food and biotechnologies; (4) Aquaculture and fisheries; (5) Tourism; (6) ICT.

In order to complete the quantitative analysis carried out in the framework of the study related to the Regional Smart Specialisation Strategy of the South-East Development Region 2021-2027, 6 focus groups were also organised with relevant actors from the region, belonging to the quadruple helix: public sector, private sector, NGOs and universities.

Focus groups were organised in the form of Entrepreneurial Discovery Process meetings (EDP), being carried out in the areas of smart specialisation identified at regional level. The role of these meetings was to identify challenges at the level of each area of specialisation in the South-East Development Region, as well as to reflect on how to address the challenges identified so as to align them with the RIS3. Each EDP brought together participants from the entire quadruple helix (public authorities, business environment, universities, NGOs).

In order to duly justify the choice of domains, a multi-criteria analysis was carried out to describe the domains, taking into account 4 criteria considered relevant for assessing the potential of the domain to become a smart specialisation field in the region: the importance of the area in the regional economy, the market, the intensity of innovation in the field, the availability of qualified human resources in the field. These areas were grouped on three strategic pillars: sustainable development through innovation, innovation in traditional industries and smart regional economy through digital transformation. Thus, the smart specialisation areas identified for the South-East Development Region are:(1) Engineering

and shipping; (2) Clothing industry; (3) Agro-food and biotechnologies; (4) Aquaculture and fisheries; (5) Tourism; (6) ICT.

Following the entrepreneurial discovery meetings, organised with the participation of public authorities, business, academia and civil society representatives, the following niches of smart specialisation, reflected in project ideas, resulted for each of the aforementioned areas:

- Engineering and shipping: development of ships with environmentally friendly propulsion for the river transport of containers/tires, development of solutions to solve problems of hydrodynamics in shipping, digitisation of information flows in the port community and their integration on the Rhine-Danube Corridor, implementation of VR technologies, deployment of innovative terrestrial monitoring technologies and batimetric determinations in port areas to control and reduce the collage of the conversion infrastructure in the Danube maritime ports, conventional propulsion solutions etc.

- Clothing industry: digital skills in textiles and clothing, superior use of waste from production, development of advanced technologies for innovative clothing, development of smart textiles and development of technical textiles, etc.

- Agri-food and biotechnologies: intelligent robotic tools, processes and assistants to support traditional agriculture, pilot station for the development of innovative biotechnologies to capitalise on waste bio-resources in the Black Sea area and secondary bio-viniculture biomass to produce complex products with potential biostimulator-bioregenerator plant nutrients, natural improvers for soils and food supplements for veterinary sector, utilisation of by-products of viticulture and winemaking (functional bio-regenerator, organic wood, food yeast, vegetable-based wastes).

- Aquaculture and fisheries: biology, conservation, artificial reproduction of living aquatic resources, research in molecular biologicals for successful reproduction of endangered fish species, selection and improvement of sturgeon genetic lines for meat and caviar production under conditions of rearing in aquaculture recirculating systems, etc.

- Tourism field: development of a tourism concept that combines health with recreational, based on healthy lifestyle (alternative therapies, healthy food, movement), cycling tourism, development of spas, slow-tourism and slow-food, historical tourism with virtual reality technologies.

- ICT: supporting digital evolution in education (research and innovation in ICT, increasing the level of digital literacy), stimulating outsourcing firms for the creation of intellectual property, development of digital innovation centers, development of document management software using AI algorithms, providing support for different applications in education, health, security

and agriculture, consulting and support offered to new innovative companies and offering solutions adapted to Romanian reality, expanding the Galati Information Technology Park.

Figure 151 Smart specialisation architecture for the South-East Region

South East Region

- Engineering and shipping
- Clothing industry

Pillar I

Innovation in traditional industries

- Agri-food and biotechnologies
- Aquaculture and fisheries
- Tourism

Pillar II

Sustainable development through innovation

Pillar III: Smart society and regional economy through digital transformation

ICT - Information and communication technology

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I.3.2.2. Description of smart specialization areas

Pillar I. Innovation in traditional industries

Pillar objective: Supporting innovation in traditional industries in the region with the aim of increasing their international competitiveness and supporting economic development at regional level.

Priority I.1. Field Engineering and Ship Transport

Importance of the area in the regional economy

The shipping industry is a very important area for the regional economy, being an important source of income and jobs in the region. The naval industry is a field of specialisation representative of the South-East Development Region, especially due to the geographical position of the counties of Constanta, Galați and Tulcea, as well as the existence of a tradition in shipbuilding and repair in the region. At the level of the South-East Development Region, several shipyards operate, such as: Constanta Shipyards, Damen Shipyards Galați, Daewoo-Mangalia Heavy Industries, Midia Shipyard, Vard Brăila, Vard Tulcea.

Shipyards in Romania are generally specialised in the construction of ships for freight and merchant vessels, and in recent years there have also been projects of military vessels. The main types of vessels built here are bulk carriers, cargo tankers, cargo vessels, fishing vessels, sea trailers, pushers and barges (UEFISCDI, 2018).

In addition to shipbuilding, in the shipyards of the South-East Development Region, activities of repair of various categories of vessels are carried out, activities that contribute to the economic growth of the region. Existing ship repair infrastructure in the region is a strength of the region. This enables the development of the shipbuilding industry, the increase in the number of jobs in the field and the development of related industries. There are several entities in the region providing ship repair services such as: Navrom Shipyard SRL, Braila Ship Repair Base, S.C. 2x1 HOLDING CAPE MIDIA SHIPYARD S.A., S.C. AKER S.A., S.C. ARGOS S.A., S.C. S.C., SV. SV. SV. SVA SVAL S.V.

There arealso numerous ports in the region which facilitate shipping:

- Constanta, seaport;
- Midia, seaport;
- Mangalia, seaport;
- Galati, sea-water port;
- Brăila, sea-water port;
- Tulcea, sea-water port;
- Cernavodă, river port;
- Harşova, river port;
- Chişcani, river port;

- Isaccea, river port;
- Sulina, river port;
- Turcoaia, indoor port;
- Mouth Arman, port inside;
- Macin, indoor port;
- Chilia Veche, indoor port;
- Mahmudia, indoor port;
- Sfantu Gheorghe, indoor port;
- Medgidia, indoor port;
- Murfatlar, formerly Basarabi, indoor port;
- Ovid, indoor port;
- Light, indoor port.

The main shipping activities in the region are:

- public maritime or river transport of persons and/or goods carried out by legal persons;

- transport of persons and/or goods for their own use in national waterway waters, carried out as an accessory activity to another economic activity, carried out by the legal or natural persons organising them, the goods transported being their property or the result of their activity, and the persons transported being their employees;

- transport of goods and/or persons for personal interest in national waterways carried out by natural persons in order to meet their own requirements for water transport, sport or leisure;

- activities related to the shipping activity.

The turnover achieved by the Romanian shipyards is about 650 million euros annually, representing about 5 % of Romania's GDP. The workforce employed in yards is about 10,000 people, with subcontracting firms on yard platforms employing about 8,000 people (UEFISCDI, 2018).

The South-East Region is in the best position of Romania's geographical area. Thus, out of the 2,635 km of inland waterways available to Romania, 1,048 km is located at the level of the South-East Region, representing 40% of the total. The 2nd place is the North-East Region, with 22 % of all inland waterways, and the 3rd place is South-Muntenia Region, with 17 % of all inland waterways at national level. This geographical specific is one of the reasons why the South-East Region is the most important region in Romania in terms of shipping of goods.

Figure no. 152 Inland waterways – % of the national total – KM
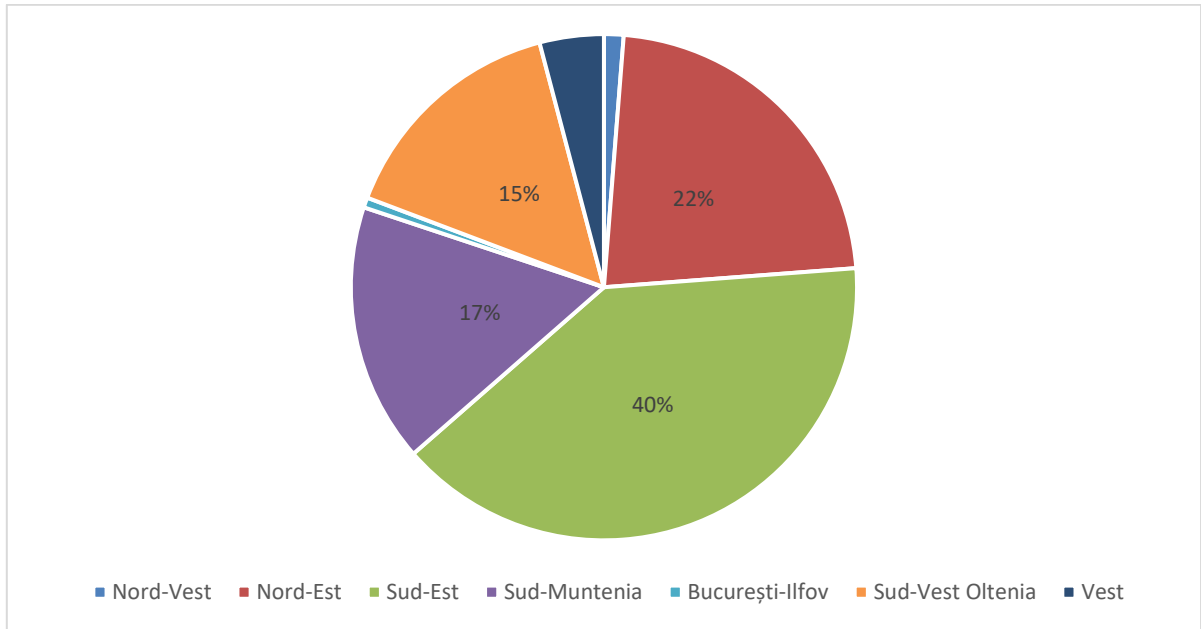
Source: National Institut of Statistics, 2020

This advantage of the South-East Region is particularly evident in terms of access to waterways. Although there are only 182 km of waterways in Romania, 70 % of them (representing 128 km) are located at the level of the South-East Region. In the South-Muntenia Region there are 10 km of waterways, while West Region has 44 km of such canals. In the North-West, North-East, South-West Oltenia and Bucharest-Ilfov regions there are no waterways.

Figure no. 153 Waterways – % of the national total – KM

Source: National Institut of Statistics, 2020

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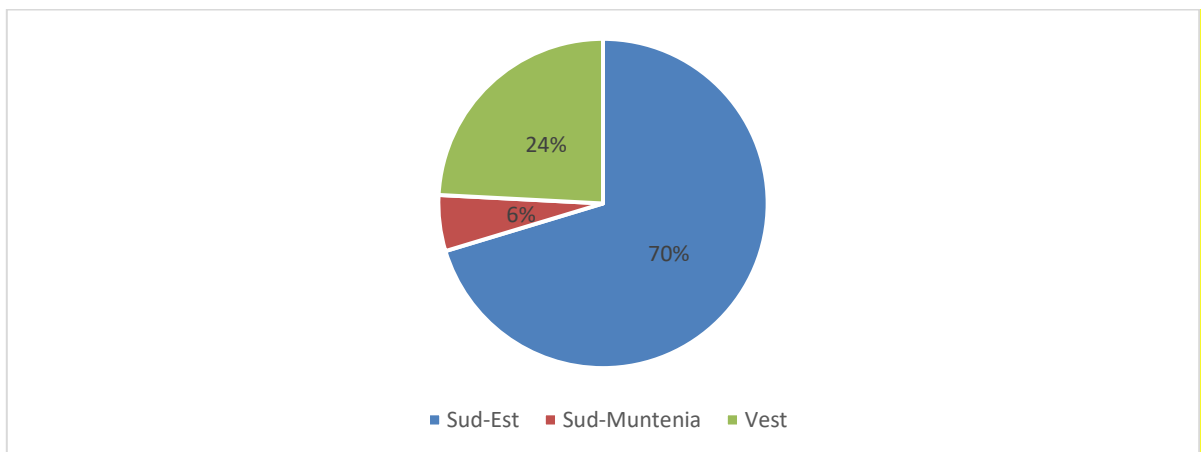
Instrumente Structurale
2014-2020

Port freight transport has shown a relatively positive trend. Both the number of goods unloaded and the number of loaded goods increased marginally between 2013 and 2019. Also, according to the NIS report on freight and passenger ports 2018, the main areas in terms of cargo ports are the ports of Constanta, Mangalia and Midia, as well as the majortimo-fluvial ports of Brăila, Galați and Tulcea.

Another important factor in the development potential of Romanian maritime transport is the good positioning of the ports of Galați, Tulcea, Giurgiu and Constanta, which are on the Pan-European Corridor VII, ensuring the connection for goods entering Europe through ports such as Rotterdam, Mainz or Strasbourg. Thus, the positioning of Romanian ports gives them strategic importance not only at regional and regional level, as the ports of Galați, Tulcea and Constanta can represent the main corridor for freight traffic to and from Asia.

Figure no. 154. Development of port freight transport, by categories of port operations
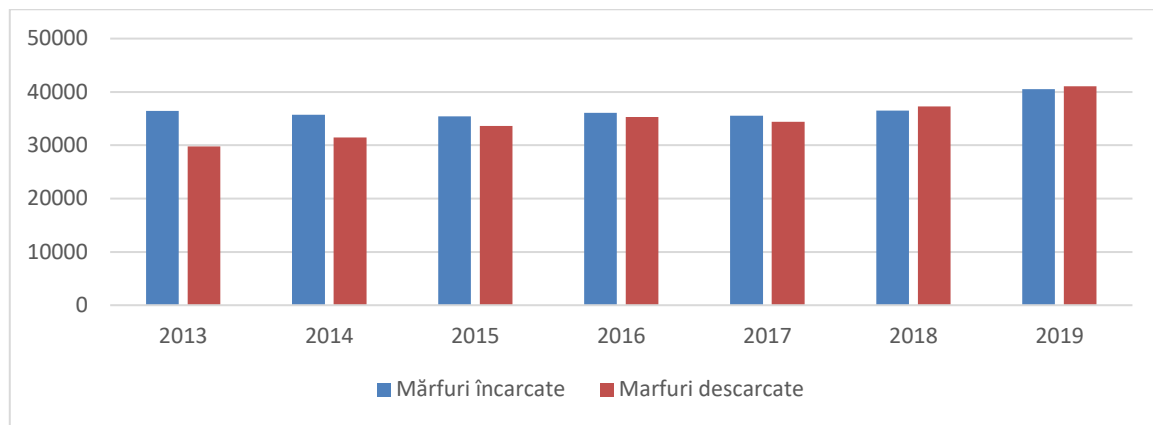
Source: National Institut of Statistics, 2020

The market

According to the Free Navigators Union, as of 2015, there were 33,000 patents and certificates in Romania, 21,000 seafarers in the navigation safety system, of which 14,600 active seafarers, 12,000 auxiliary personnel. Also, the data published by the Ministry of Finance show that at the level of 2015, the first 8 shipyards of the country registered revenues of 4,405,408,750 lei. Also in 2015, companies in the shipping industry registered significant revenue increases compared to the previous year, which demonstrates the upward trend of the industry and the special development potential (Daewoo Mangalia Heavy Industries (+ 112 %), Constanta Shipyard (+ 82.50 %)).For example, the report of the Board of Directors of the Free Navigators Trade Union shows that only Constanta Shipyard repaired 94 vessels for foreign beneficiaries and 20 vessels for Romanian beneficiaries in 2016. Moreover, production capacities for 2017-2018 are 100 % covered with works, with the company signing the contract for the construction of six 41,000 tdw chemical tanks.

Innovation intensity in the field

The most important naval research and design center in Romania, ICEPRONAV S.A., is located in Galați. ICEPRONAV S.A. Galați is a private company of design, research and technological engineering for shipbuilding, which runs including fundamental and applicative research projects in the field.

Innovation in the field is also supported by the Romanian Association of Shipbuilders – ANCONAV, representing the interests of shipyards and manufacturers, distributors of equipment and raw materials in Romania at national and international level.

At the same time, innovation in this field is supported by education and research institutions in this field: University "Lower Danube" Galaţi – Faculty of Naval Architecture and Faculty of Engineering, Maritime University of Constanta, Naval Academy "Mircea cel Bătrân" in Constanța, the vard construction sites Brăila and Tulcea which have CNSCI accredited RD departments for naval design.

Availability of qualified human resources in the field

The universities of Galați and Constanța are the main sources of highly qualified workforce for this branch of activity. The Maritime University of Constanța has two faculties: Shipping and Naval and Electromechanical Naval Transport. The Naval Academy had 1,937 students in 2020. The "Lower Danube University of Galati trains specialists in the field of naval industry within the Faculty of Naval Architecture, where scientific personalities who contributed to the development of the local naval industry were formed and activated.

Priority I.2. Clothing industry

Importance of the area in the regional economy

The textile and clothing industry is one of the main branches of the regional economy, both in terms of contribution to GDP, growth of exports and employment, and its potential to develop competitive advantages, through refurbishment and innovative approaches.

Over the last 30 years, the textile sub-sector has undergone a series of transformations and adaptations to a changing market, with its development being marked by the reduction or even cessation of activity in a number of production capacities. On the other hand, the clothing sub-sector has seen an important upward trend in the same period of reference, supported by the development of Iohn's production, which has led to an increase in clothing exports to the European external market.

Lohn[43] is a type of international contract, widely practiced in countries with cheap labour, whereby a producer undertakes to execute a product at the order of a beneficiary in exchange for remuneration.

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[43],Prognosis on the evolution of the textile, clothing and leather sector in the period 2009-2014" and "Indicators of the Textile, Clothing and Leather Sector in 2012]Reindustrialisation Strategy of Romania"

In lohn operations, the importing company usually transmits all the necessary textile materials (wovens, film knits), design, technical documentation, clothing accessories, and the manufacturer in the partner country often contributes only to the manufacture of garments or knitting.

The development perspectives of the clothing industry are influenced by the action of a combination of factors, which play a synergistic role in developing and strengthening the competitiveness of domestic products on international markets. Of these, it can be mentioned[44]:

- labour forcefactors, i.e.: labour costs, productivity, regional labour supply and qualification, management, skills and know-how;
- industrial factors: internal availability of raw materials, endowment with efficient machines and machinery;
- general economic factors such as: access to funding sources, cheap energy availability, expenses for carrying out the transaction in a broad sense, including difficulties in conducting import/export procedures, bureaucratic inefficiency, state of transport and infrastructure within the country;
- commercial or service factors such as: security of delivery deadlines, product quality, compliance with customer specifications, flexibility and fast response to orders, design and own fashion creations, geographical proximity to the customer, cultural and language proximity.

In 2018, in the South-East Region, the number of local units active in the textile manufacturing sector (CAEN Code 13) was 133 companies, thus increasing by 37.11 % compared to 2014. Making a hierarchy at national level, South-East Region occupies the penultimate place in terms of the number of companies active in this field, at a distance of 119 units compared to the region ranked by the first place, namely North-West Region.

Deepening the analysis according to the counties, it is found that most local active units are present in the counties of Buzău (34), Galați (30) and Constanța (29).

Below we will analyse the dynamics of this field of smart specialisation, taking into account the ecosystem of business actors and their notable performances.

The market

The textile and clothing industry has an old tradition in Romania, totaling at the level of 2018 about 3.8 % of the total number of employees, about 191,000 people, in more than 8,500 companies. Around 20 % of them work in the textile manufacturing sector, 56.7 % in the field of clothing manufacturing and the rest in the leather-shoe sector.

We[44] *bid 37*

According to the Textile Dialog (2019), a certain constancy was noted in the period 2017-2018 at the level of imports of textile products. Thus, from a figure of EUR 1.492 billion in 2017 to EUR 1.495 billion in 2018, an increase of 0.02 % in imports. In terms of exports, in the period 2017-2018 there was a positive trend with an increase of 3 %, from EUR 792 million in 2017 to around EUR 816 million in 2018. Exports of silk fabrics (+ 61,9 %), wool and wool fabrics (+ 30,5 %), wool and wool yarn (+ 18,3 %) and cotton and cotton yarns (+ 17,3 %) were the largest increases. Despite this positive development, the balance between exports and imports remained negative. The balance between exports and imports was -47 % in 2017 and -45.4 % in 2018.

The following textile companies have been identified in the South-East Region: Ring Textile Production RTP SRL, Textbra SRL, Mistral confezioni SRL, Artifex Focşani SRL, Conterra SA, SC Datsa Textil SRL, SC Sorste SA, SC Braiconf SA. Although they have efficient know-how and production equipment, regional manufacturers in the clothing sector face difficulties in finding available qualified human resources.

Innovation intensity in the field

Innovation activity in the region is low, but there is a potential for development of the sector by addressing a strategic orientation, i.e. by shifting the inclination from high volume and low added value to innovation-based production. The strong tradition and knowledge gained in the field as well as the high quality of products are the strengths of the regional textile industry, and these strengths can be coupled with a much better use of creative resources and untapped potential in this area. In addition, creating favourable conditions for cooperation and reorganisation of economic actors, including through the creation of clusters in the field, could support the development and drive of this sector to the top of the performing and competitive industries.

Availability of qualified human resources in the field

The clothing sector plays a key role in job supply and support for the region's employment rate. According to data provided by the NIS, in 2018, the average number of employees in the textile manufacturing industry was 2,203 employees, mostly women, down by 2.1 % compared to 2014. At the level of the region there are vocational schools that offer qualifications in textile clothing (e.g. the Technical College "Gh. Asachi" from Focşani), who can form clothing design technicians, textile products makers or clothing designers.

Pillar II.Sustainable development through innovation.

Pillar objective: Supporting sustainable development in key areas of the region with the aim of improving the standard of living for all inhabitants of the region.

This pillar aims to develop sustainable R & D and innovation of those economic areas in the region that have potential in terms of the use of natural resources and geographical characteristics of the region. The areas proposed under this pillar have the potential to specialise intelligently, having an economic and social impact on regional development by creating new research entities and developing existing ones, creating new jobs and improving labour productivity through refurbishment.

The three priority areas of agro-food and biotechnologies, aquaculture and fisheries and tourism are interrelated and benefit from a critical mass of organisations and employees across the region. The fields have a tradition in carrying out activities, being supported by the existence of research and development institutions with the potential to carry out innovative projects. The implementation of RDI projects at the level of these entities can enable the region to make a substantial advance in global value-added chains.

While largely supporting the local economy, these areas with extraordinary development potential face a lack of national and international competitiveness, requiring a paradigm shift. Collaboration and innovation are essential activities in support of the development of areas, and sustained efforts and financial and human resources are needed. Developing the skills needed for innovation in agriculture, aquaculture and fisheries and tourism is a sine-qua-non condition.

Priorities:

II.1. Agro-food and biotechnologies

II.2. Aquaculture and Fisheries

II.3. Tourism

Priority II.1 Agro-food field and biotechnologies

Importance of the area in the regional economy

The agri-food sector covers all production and activities engaged in agriculture and food processing and the functional relationship system linking producers, processors, carriers, storage, distributors, traders and/or stock exchanges trading the same product or group of products for its use and/or consumption. The UN Convention on Biological Diversity defines biotechnology as: 'Any technological application using biological systems, living organisms, or derivatives thereof, to create or modify products or processes for well-defined purposes'. Areas are interconnected and innovation can be a bridge.

Grossvalue added from agriculture, forestry and fisheries was 6701.3 million lei in 2017, representing 8.42 % of the total regional GVA. The region also accounts for the highest share of agriculture in the formation of regional GDP (7 %).

In 2018, in the South-East Region there were 3,729 local units active in agriculture, forestry and fishing, most of which were active in Constanța County (980).

The largest share of plant production in 2017 was South-Muntenia Development Region (20.9 %), followed by South-East Region (19.2 %).

The South-East Region is an agricultural area, traditionally, but also due to its geographical characteristics. Pedoclimatic conditions in the region favour the cultivation of maize (especially in the north), wheat (in the centre of the region), barley, industrial plants, sunflower, and organic agriculture. The region ranks first in the country in terms of the area of fruitful vineyards. The production value of the agricultural branch was 15,256,105 lei at the level of 2018.

The South-East Region has the second largest area at national level, cultivated with the main crops, after the South-Muntenia Region, with a total area of 1,745,808 hectares in 2019. The largest areas were for wheat and rye cultivation (460.422 ha), maize (502.721 ha), oily plants (429.548 ha).

According to the UEFISCDI study "Smart specialisation in field crops in the South-East Region", the region could also have increased potential in rice cultivation, as the Danube region has water supply suitable for this type of culture. If in 1990 in Romania were cultivated 39,887 ha of rice, 15,477 of which in the South-East Region, in 2019 Romania was cultivated 7,427 ha and only 4.172 ha in the South-East Region. Even so, Romania is among the top rice producers in Europe, being surpassed only by Italy (280.000 hectares) and Spain (80.000 hectares). Romania, through the South-East Region, is considered the country of the European Union with the greatest potential for growing rice, as the Danube region has 20 times more water reserves than the Po basin – the area where most of the Italian rice is grown (UEFISCDI, 2018).

Also, of the total area of vineyards in Romania (178.230 ha), almost 40 % is found in the South-East Region (70.035 ha). In 2019, the region had the largest total grape production in our country, counting for 42 % of the total production. Romania is one of the countries with tradition in vine culture, the climate and soil conditions of our country being favorable to this culture. The area cultivated with table grape vineyards is the area occupied with vineyards for the production of table grapes. Both the vineyards and the young vineyards unentered in fruit are covered.

The introduction of biotechnologies within this field of smart specialisation for the South-East Development Region is justified by the huge agricultural potential of the region, but also by the need to develop bio-resources and protect the environment. Also, at the level of universities and research institutes present in the region have been implemented several research projects in the field of biotechnologies related to systems for monitoring invasive species, research and technological development for organic insecticides, chemical and biochemical analysis of greenhouse soil, elimination of excess iron and copper ion from wine through reverse osmosis membranes, evaluation and forecast

of the evolution of the agroecological potential of land in the Romanian Plain and Dobrogea for sustainable water resources and conservation resources.

The increased interest in the region for R & D and innovation activities in the field of biotechnologies is supported by the development of scientific events dedicated to biotechnologies, such as the conference "Modern Biotechnologies in Sustainable Development of the Danube Delta" organised by the National Institute for Research Development for Biological Sciences Bucharest (INCDSB) in Tulcea in 2016. A few arguments to support the need for the development of biotechnologies in the region can be listed: agri-food biotechnology contributes to the conservation of natural resources, reducing CO_2 emissions, improving soil quality and high productivity; agri-food biotechnologies can provide products with increased quality and safety in conditions of more efficient use of resources and environmental protection; the economic contribution of biotechnology to agriculture at EU level is 36 %; the use of biotechnologies is estimated at the level of 2030 to contribute to around 50 % of agricultural production; environmental biotechnologies are effective in a sustainable development based on pollution reduction; biodiversity must be preserved through biotechnologies; there is great potential for clustering in the field of environmental protection; the superior use of biodegradable waste and by-products through biotechnological processes can increase well-being in the region by creating new jobs and improved living conditions.

The market

The EU is the world's largest cereal producer and trader. Given the importance of the sector, the EU supports its farmers through income support, market interventions and trade policy, all of which are supported by the Common Agricultural Policy (CAP).

At national level, over 7,000 companies, with more than 40,000 employees, are currently active in Romanian agriculture, on the grain growing segment. Between January 2019 and July 2020 more than 10 million tonnes of Romanian cereals reached the extra-Community markets, out of a total of 51.2 million tonnes, as it exported the entire Union. The value of agricultural production at national level decreased by 3.8 % in 2019 compared with the previous year, to 89.997 billion lei. However, Romania is, after France and Germany, the third largest exporter of cereals in the EU. Also, on the oil market, our country is among the major exporters, between 2007 and 2017, exports of oilseeds and cereals doubling up to 12.6 million tonnes.

It should be noted that most agricultural companies are registered in the South-East Region (21.15 %). The county with the largest share of the agricultural area of the total regional agricultural area is Tulcea, followed in the regional ranking of Brăila, Constanța, Vrancea. The cumulative turnover achieved in 2016 by the plant production farms of the South-East Region (NACE 0111 and 0112) is 4.38 billion lei, for a total of 9,350 employees and a profit from exploitation of 21%.

Demand for organic products is growing at international level, with the need to eat healthy and increasingly urgent. Organic agriculture, well-developed in the South-East Region, places Romania at the 15th place worldwide as an exporter of organic agricultural products, with the main products exported cereals, oils and protein plants, to the markets in Germany, Austria, Belgium, Netherlands, Italy, Switzerland, Denmark (UEFISCDI, 2018). 70-80 % of Romania's organic production is exported annually.

Among the representative companies of the Romanian bio-products industry are: Apicola SRL, Apiprodex SRL, Bio Carpathia Cooperativa Agricola, Dry Fruits Transilvania SRL, Ecofruct SRL, Brothers Calciu SRL, Mudan Gadal SRL, Novita Impex SRL, Phenalex SRL, Premium Fruct SRL, Primagra SRL, Regiu Plant SRL, Remete Lekvar SRL, Szasz Ilyes Individual Enterprise and Transilvania Nuts SRL.B.H.S. Bio Innovation, from Buzău County, strongly supports organic farming by producing a natural fertiliser, which food producers can use to obtain an organic crop.

Innovation intensity in the field

Promoting innovation in agriculture is not a new topic, as it is already part of the European Commission's programme, with initiatives such as the European Innovation Partnership on "Agricultural Productivity and Sustainability" (EIP) or Horizon 2020 (Horizon 2020).

It is the European Innovation Partnership/European Innovation Partnership (EIP) that promotes an economically viable agricultural and forestry sector, efficient in resource management, environmentally and progressively in agri-environmental production systems, thus contributing to the constant and sustainable supply of food and feed, improving environmental conservation processes and building relationships between researchers, experts and farmers, rural communities, entrepreneurs, non-governmental organisations and consultants.

In the agri-food sector it is necessary to develop innovative solutions that focus on the needs of farmers or foresters, also addressing the interactions in the supply chain. In the South-East Region, the number of patent applications for vegetable and fruit varieties was the highest in Buzău County, followed by Constanța County.

In order to achieve increased productivity in agriculture, but also due to climatic conditions in recent years, irrigation is essential in the agriculture of the South-East Region. The area of land with irrigation works did not change significantly between 1997 and 2019, increasing from 1.199.506 ha to only 1201189 ha in 2019. Through partnership with the National Institute of Research and Development for Machinery and Installations for Agriculture and Food Industry Bucharest – INMA, representatives of the South-East Region (Research and Development Resort for Sand Plants Culture Dăbuleni and Research Station for Pomiculture Development (SCDP) Constanta) have implemented the SMARTIRRIG project – Innovative technologies for irrigation of crops in climate conditions, semi-arid and sub-arid. The

purpose of implementing these technologies is to make the best use of conventional and unconventional water resources and to mitigate the effects of climate change, so as to enable all entities involved to strengthen scientific and technical competences in this area of strategic importance for Romania's economic and social development.

Refurbishment in the region is also carried out at the level of local firms, e.g. Agricost IMB in Brăila County, the company with the largest agricultural holding in the EU investing heavily in innovative technologies for the processing of alfalfa, machinery and irrigation. The "Prototy Farm" project is a project to optimise all operations at farm level. RDI activities also take place in research resorts and universities present at the level of the region carrying out projects for the efficient use of water resources in irrigation facilities, improving rice cultivation technologies, applying conservative agricultural work technologies to combat drought, etc. For example, the project "Biostim" aims to develop new plant biostimulants, starting from organic wastes after harvesting agricultural and horticultural crops, which can be used in the process of plant life-responsiveness.

Availability of qualified human resources in the field

In terms of participation in the main economic activities, the share of civilian employed population in agriculture, forestry and fishing in the South-East Region is 13.7 %, totaling 239.5 thousand persons, of which 118,9 thousand women. At the level of 2019, the average monthly net nominal earnings in agriculture, hunting and related services was only 2.133 lei.

Statistics show that Buzău is the county with the largest number of people employed in agriculture, compared to the other counties in the South-East Region, about 22.17 % of the total active population working in agriculture at the level of the region being registered in Buzău County. After Buzău, the counties of Constanța, Vrancea and Galați also have a high share among the population employed in agriculture. In terms of labor productivity in agriculture, it is well below other sectors of activity in the economy, but it has an increase in 2019 compared to 2018 from 20.482 lei/person to 22,650 lei/person.

However, studies show that overall, the availability of human resources is unsatisfactory, both due to the chronic shortage of qualified personnel in the field/agricultural workers, as well as by highly trained specialists. The available workforce in the region prefers to work abroad or in multinationals, although good pay conditions are also offered for domestic agricultural firms (UEFISCDI, 2018).The quality of training of university graduates is low and intensive internships are needed to increase skills in the field.

Priority II.2. Aquaculture and Fisheries

Importance of the area in the regional economy

Romania has an exclusive economic zone of 25,000 km² and a coastal area of 250 km on the Black Sea. The hydrographic network of Romania is 843,710 ha, which represents about 3 % of the total area of the country. The production capacity of the Romanian fisheries sector comprises: 400.000 ha natural lakes (including the Danube Delta) and reservoirs, 84.500 ha fish farms, 15,000 ha nurseries, 66,000 km of rivers, 18.200 km in the mountain area and 1.075 km of the Danube River. Fisheries and aquaculture have still occupied and occupies an important place among the areas of national interest. Although the fisheries sector has made a small contribution to the national economy (GDP and GVA), the importance of this sector is given in particular by its social role for coastal populations through its potential for food resources. It helps to protect wetlands and biodiversity of species in the country's waters.

The Romanian fisheries sector includes aquaculture, marine and inland fisheries, as well as processing and marketing activities. The most important activity is freshwater aquaculture, followed by inland fisheries. Inland fishing is more developed than coastal fishing on the Black Sea.

The largest areas for aquaculture (65 % of the national area) are concentrated in the South-East Region. At county level, 3 % goes to Brăila County, 2 % to Buzău County, 14 % Constanța, 2 % Galați, 79 % Tulcea and 0.48 % Vrancea County. Tulcea County owns 99.6 % of the total pools and natural lakes. From the trout category, 44 % go to Buzău County and 56 % to Vrancea County.

The fisheries sector in the South-East Region includes:

1. Marine fishing activities on the Black Sea, practiced along the Romanian coastline.

The Romanian Black Sea coast has a length of 245 km, with commercial fishing practiced in natural fish habitats, up to 180 days a year. In 2018, a total of 259 commercial fishing authorisations were issued: 48 for turbot, 71 for the rapana and 140 for other species. Romania's fishing fleet is naturally concentrated entirely in the South-East Region and has decreased considerably in recent years, reaching 162 vessels in 2019, of which 138 active and 24 inactive, with a total capacity of 6,235 kW. Of these, 60.49 % are small boats, 12.96 % are 12-18 m boats, 8.64 % are 0-6 m boats, 2.47 % are 24-40 m boats and only 0.62 % boats of 18-24 m. The boats have obsolete equipment and installations, do not provide operational safety and do not meet current requirements, with no ice and storage facilities. With no specialised fishing ports in Romania, fishing vessels use the commercial ports – Constanța, Mangalia, Sulina – as landing ports, which do not offer specific fishing facilities. The size and condition of the fleet, together with the lack of adequate support infrastructure, limits the ability to exploit existing fish stocks. In 2019, the total fish catch was 7.149.380 kg, with 25 different species fishing. Between 2013 and 2019, there was a positive trend in fish catch, from 1,617 tonnes in 2013, to a maximum of 9,553 tonnes in 2017 and a slight decrease in the following years to 1,749 tonnes in 2019.

2. Inland fishing activities, which are carried out on the Danube as well as in the Danube Delta area by small wooden boats and have no mechanised means. In inland waters, fishing is regulated on the basis

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of licences, and is mainly practised as a main activity by professional fishermen. In some cases it is a livelihood for people who do not have sufficient income from other activities. There are 36 landing sites in the Danube Delta, of which only 16 meet the veterinary and sanitary standards and the rest must be modernised and equipped.

3. Aquaculture.In Romania, according to the Register of Aquaculture Units updated on 31.08.2020, there were 1,407 registered units. In the South-East Region there were 250 nurseries and breeders. Of these, most were in Tulcea counties (99 units) and Constanța (52 units), followed by Buzău County (32 units), Brăila (27 units), Galați (21 units) and Vrancea (19 units).The total aquaculture production in 2019 was 15,123 tonnes of fish, especially trout, carp, novac, caras. It can be observed that production has increased considerably in recent years, with only 11,015 tonnes in 2015.

Marine aquaculture has a relatively recent development in the Black Sea. Despite all the difficulties, there is a desire for forward-looking regional development, both technologically and productively. Marine culture can be deployed directly at sea, in floating installations, anchored, but also in the coastal part of the land, with the possibility of direct supply from marine water. Along the Romanian Black Sea coast, four areas suitable for mollusc culture have been identified:

- area 1, Perișor – Chituc – 215 mm,
- area 2, Năvodari – Constanța Port – 109 mm,
- area 3, Agigea – Mangalia – 101 mm.

These were identified by the local natural populations of molluscs and their quality (sanitary, biochemical, food) as well as the quality of the substrate needed to fix these filtering species.

Traditionally, complementary areas of fish processing, fish trade and fish products are developed in the region. According to data from RNCD 2018, there were 31 processing units for fish and fish products in Romania, of which: 18 units had as their main activity the processing of fish and fish products, and 13 were secondary to the processing of fish and fish products. Through the 2007-2013 Fisheries Operational Programme, 5 new processing units were financed, increasing by 6,808 tonnes fish processing capacity (UEFISCDI, 2018). Also, through the Operational Programme for Fisheries and Maritime Affairs 2014-2020, a number of 177 projects were financed in the South-East Region, most in Tulcea County (92 projects), followed by Constanța County (31 projects), Brăila county (30 projects), Galați county (19 projects), Vrancea County (3 projects) and Buzău county with only 2 funded projects. Most projects funded by OPFMA 2014-2020 aim at stimulating sustainable aquaculture through productive and innovative investments, promoting resource efficiency or aquaculture providing environmental services. At the same time, a significant number of projects have been dedicated to increasing employment and territorial cohesion, as well as improving the infrastructure of fishing ports.

In 2019 authorisations were granted for 1,652 fishing vessels in continental waters and for 278 fishing

vessels on the Black Sea. The total catches taken are 3,435 t for inland fisheries and 7,745 t for marine fishing (https://ampeste.ro/).

The sector-specific infrastructure is underdeveloped and ports, landing points, first-sale points are absolutely necessary for the development of the field. Although with regard to the improvement of specific infrastructure, OPFMA supported the establishment of 9 fisheries shelters, boats used in small-scale coastal fisheries land in locations where landing facilities are not provided: Mangalia, Olimp, Costinești, Mamaia, Cape Midia, Sfântu Gheorghe and the download point from Sulina. Thus, the infrastructure of fishing ports with specialised berths and storage facilities as well as the locations for organising the first sale of fish are entirely missing. Fishing at the Black Sea is dynamic and is dependent on migration of fish species, which involves landing the catch at different times in different ports by the same vessels. In 2019, 127 landing points and 147 first-sale centres were authorised for catches made in natural fish habitats. Considering the realisation of the Tulcea Fish Exchange, dimensioned to trade approx.11.000 tonnes of fish, coming from catches on the Black Sea and inland fisheries and aquaculture, modernising landing points and first-sale centres are a necessity to ensure the optimal quality of the products caught and sold and to achieve acceptable profitability (ampeste.ro).

Romania's fishing fleet, both on the sea and inland waters, is morally worn, using non-performing techniques. It is necessary to have specialised fishing gear and fishing nets differentiated by species of fish, applying environmentally friendly fishing methods to ensure the sustainable development of fishing. In the marine fisheries sector, the lack of investment in the sector causes low productivity, small quantities in catches and a low degree of technical working conditions. The fisheries sector's contribution to gross value added (GVA) is very low, with weights ranging from 0.0058 % in 2005 to 0.0049 % at 2008 level. As regards the share of the fisheries sector in gross domestic product (GDP), values ranged from 0.0047 % in 2005 to 0,0086 % in 2008. According to ANPA's Annual Data Collection Report, the profitability of the domain is low due to high production and exploitation costs and environmental restrictions. Thus, almost 90 % of the total expenditure incurred by an economic operator is the raw material, operating and staff costs.

The field of aquaculture and fisheries is also important for the South-East Region and in terms of the development of fishing tourism, especially in the Danube Delta area, by creating a specific infrastructure, fishing-specific tourist packages and information activities on natural, cultural or recreational tourist objectives in the area.

The market

Studies show that only 12% of the national consumption of fish products is covered by domestic production, which shows an internal market with high absorption potential (UEFISCDI, 2018). In recent years, the amount of fish meat consumed by Romanians has increased. However, we are among the

bottom countries in Europe for fish consumption. A Romanian eats about 7 kilograms annually, while the average in the West is 24 kilograms.

In 2018, in Romania, 43.09 % of consumers consumed up to 2 kg of fish or fish products monthly, while 3.01 % consumed at least 5 kg/month. According to EUMOFA data, for 2015 an average consumption of 6,2 kg of fish/capita was reported for Romania.

Of the consumption preferences by assortment of products:

- 92.55 % prefer fresh fish,
- 74,47 % egg salad,
- 53.37 % canned fish.

As regards preferences by type of species:

- 84.04 % prefer carp,
- 57,62 % prefer mackerel,
- 53.01 % prefer trout.

From the point of view of the periods of time when fish sales are higher, there is a common line, namely the spring period, March to April and autumn-winter period, October to December and, in certain areas (Danube Delta, coastal zone) where fish form the basis of the local population's diet, up to 80 %.

The total quantity of fish sold in Romania is 120,000 tonnes per year. Of these, 100,000 are imported and only 20.000 represent local production. Of what we produce in the country, 12,800 tonnes are made from aquaculture, 2,000 tonnes from the Black Sea and about 4,000 tonnes from inland waters.

Associations such as "Romfish" advocate for a legislative and administrative framework that encourages the development of the businesses of those active in the fisheries sector in order to be able to provide consumers with high quality fish under natural conditions and increase the market share for the Romanian fishery.

At the same time, the chain of producer– processor – trader is insufficiently organised. The link between producers and the market throughout the distribution chain is deficient, with consequences in lowering product quality or increasing costs and not covering areas. Access to supermarkets is often difficult for small operators who cannot meet quantity requirements and have no bargaining power. Marketing is primarily affected by the lack of specialised equipment and means of transport (https://ampeste.ro/).

Innovation intensity in the field

The innovation activity in the field is low, but there is a great potential for development of the field, especially due to the allocation of financial resources through the Operational Programme for Fisheries and Maritime Affairs 2014-2020 for Romania, as well as the programme that is in preparation, PAP

2021-2027. Innovation in aquaculture and fisheries is also supported by the existence of a significant number of research institutes and universities with activities in this field, established at national level:

- The National Institute of Research and Development "Danube Delta" – INCDDD Tulcea, with research and development activities on the structure, evolution, functioning and modeling of ecosystems, wetlands; sustainable exploitation of biological resources; restoring populations of declining species; restoring ecosystems;
- The National Institute of Research and Development for Marine Research "Grigore Antipa" – INCDM Constanta, with various activities of ecology and protection of the marine environment, oceanography, marine engineering, resource management;
- National Institute of Research and Development for Marine Geology and Geoecology – GeoEcoMar;
- Institute for Research Development for Aquatic Ecology, Fisheries and Aquaculture – ICDEAPA Galati;
- "Ovidius" University of Constanta;
- The Maritime University of Constanta;
- "Lower Danube" University of Galați.

The transfer of the results of RDI activities in the field of commercial fisheries is low, with disparities between the results of fisheries research and their use by stakeholders. Revenues from commercial fisheries actors do not support the costs of accessing research results in this area. Accessing non-reimbursable funds can be a viable and necessary solution to boost technology and know-how transfer in the field.

Romania has tradition and results in the field of fish breeding and breeding with sufficiently dynamic research into extensive and semi-intensive systems and technologies, with experienced and skilled producers, with areas and technological systems suitable for the growth of a wide range of fish species. As a result of the knowledge gained and the technological results obtained in the field of research and education, over the last 15 years, many farmers are applying intensive growth technologies in different types of basins and installations using modern techniques and equipment, as well as aquaculture in recirculating systems (https://ampeste.ro/).

In March 2019, the National Fisheries Network was operational. This can be a structure to boost R & D and innovation in this area. The network operates within the structure of DGP AM POPAM and has as its main objective to support the 22 FLAGs in their efforts to contribute to the sustainable development of fisheries areas. The main activities carried out within the Network are: dissemination of information, strengthening administrative and institutional capacities of FLAGs, sharing best practices and supporting cooperation between FLAGs at inter-territorial level, facilitating ideas for developing

innovative projects, preparing the launch of Measure III.4 Cooperation actions. The National Fishery Network has a total of 48 members, of which: 22 FLAGs and 26 other entities (associations, local public authorities, associations, institutes, firms, experts, etc.).

Availability of qualified human resources in the field

Commercial fishing in Romania is an activity with a long tradition, especially due to the hydrographic network and existing fisheries resources. Both in the coastal area, in the Danube area, in the area adjacent to the main rivers, but especially in the Danube Delta, a large part of the population has as a traditional activity fishing, which has both a social role and the provision of food resources, still recognised in the Danube Delta where a share is allocated to family fishing. Moreover, these areas coincide with the area of authorisation of commercial fishing in Romania (https: //ampeste.ro/).

At national level, there are 4,574 professional fishermen and 2,968 fishers in the fisheries sector. Of all fishermen, 1,720 are in the Danube Delta, 2,215 on the Danube River, 168 on the reservoirs and 471 on the Black Sea. Number of recreational fishing permits issued by ANPA until 06.11.2019:

- The Black Sea: 23.450;
- Danube with its canals and non-contracted waters: 163.150;
- Number of permits issued by associations of recreational fishermen: 100.309;

The situation concerning the number of authorised marine commercial fishermen in 2019 shall be as follows:

- 483 fishermen on the Black Sea;
- 369 divers;
- 184 fishermen on the Danube.

The small number of fishermen on the Black Sea is justified by the low-developed specific infrastructure (ports, landing points, first-sale points, shelters), but it is also caused by old ships with non-performing techniques and equipment, which lead to low profitability due to high production/exploitation costs (POPAM 2014-2020)

According to data from the National Data Collection Report 2018, the number of persons employed in the processing sector was 1,454.

The aquaculture and fisheries sector has a particular potential to develop jobs in the South-East Region, in particular through European funding programmes. Only through Axis 2 of the POP 2007-2013, 832 new jobs were created. Although the need for staff exists, there is a lack of qualified staff in the region, due to the lack of promotion of vocational, secondary and post-secondary schools. In fact, the only university in the region that has higher education programmes in fisheries and aquaculture is the "Lower Danube" University of Galați, with the programmes "fish fishing and industrialisation" and

"Pisciculture and aquaculture".

Priority II.3. Tourism

Importance of the area in the regional economy

Tourism is an area of very high development potential in the region. The South-East Region comprises almost all forms of relief: The Danube meadow, Bărăganului Plain, Dobrogei Plateau with Măcinului Mountains, and the northwestern part of the region comprises a part of the Carpathians and Curbura Subcarpathians. The region is also crossed by the Danube River, encompassing the Danube Delta and is bordered to the east by the entire Romanian Black Sea coast. All these features favour the development of traditional tourism (mountain tourism, seaside tourism), spa tourism and even niche tourism (e.g. wine tourism).

Coastal tourism takes place on the entire Black Sea coast, on 245 km between the border with Ukraine and Vama Veche (the border with Bulgaria). Seaside resorts, well known in international tourism: Năvodari, Mamaia, Eforie Nord, Eforie Sud, Techirghiol, Costinești, Olimp, Neptun, Jupiter, Aurora, Venus, Saturn, Mangalia, have accommodation and treatment units and various recreational possibilities.

Spa and treatment tourism recorded a steady growth trend in the region, as demonstrated by the evolution of the capacity utilisation index in Techirghiol and Mangalia. Of course, sightseeing in the spa resorts of this region also includes an important part of summer seaside tourism. In Techirghiol resort there have been several investments in previous years, both in urban infrastructure, in landscape rehabilitation of the city's lake, as well as for the development of medical care infrastructure.

According to GD 1072/2013, the localities and areas for which the status of balneoclimatic resort is granted are: Mangalia Municipality, Constanța county and the corresponding area: Saturn, Venus, Cap Aurora, Jupiter, Neptune and Olympus; City of Eforie, Constanța county; The city of Năvodari, Constanța County; Techirghiol City, Constanța County.

Niche tourism is one of the fastest growing sectors in the field. It has the advantage of adapting to the individual needs of consumers, being closely linked to some hobbies. Tourism can be niched on food, sports, adventure, history, nature, etc. Born as an elitist and very expensive concept, niche tourism is now accessible to the majority.

Wine tourism has begun to develop in the region. In addition to a presentation of vine varieties, wine tastings or presentations of the technological process, tourists can create their own cutouts and carry out sports activities in nature. Visits to wine cellars can be made, for example, at the Lacerta Winery in

Buzău County, Rasova Winery in Constanța County, one of the most modern in the country, Aurelia Vișinescu wine cellar in Buzău County or the Panciu Domeniile wine cellar in Vrancea County.

Another type of niche tourism that can develop especially in the South-East Region is ornithological tourism or birdwatching where bird enthusiasts go to densely populated areas of birds to observe, film or photograph wild birds. In the Danube Delta there are already several ornithological tour operators, most tourists being foreigners.

The South-East Region is also very tender for cyclotourism, although the infrastructure for cyclotourism is in its early stages. In Constanța County there are 9 cycle paths MTB XC, in Buzău County there are 8 such routes, but in the rest of the counties there can be organised tourist routes by bicycle.

Another type of niche tourism has great potential in the region is culinary tourism. It is already extensively practiced in the Danube Delta where tourists can taste many dishes based on local fish, but can also be developed in other counties.

In the area of Soveja – Lepșa in Vrancea, in addition to a picturesque landscape, an unpolluted air with high concentration of ozone, favoring outdoor tourist activities.

Within the region there are a number of the most important isolated tourist centers being Adamclisi with the Tropaeum Traiani Monument (sec. II A.D.), the funeral shrine; Babadag, the tomb of Geamia Ali-Gazi Pasha,the tomb of Baba Sari Saltuk Dede; Panaghia House near the window that houses the exhibition of oriental art objects; Babadag Forest Natural Reservation; Poiana with monuments carved in limestone, the natural complex of Cheia, located in the basin of the Casimcea River, 7 km N from the place. It's a bargain. Other sights can also be seen in the cities of the region.

At the level of the South-East Development Region, the number of tourist reception structures increased significantly in the period 2014-2020. While in 2014, the number of tourist reception structures at Region level was 1,282, at the level of 2020, the South-East Region registered 1,652 tourist reception structures, representing an increase of 22.4 %. Regarding the progress achieved, it is noted the significantly positive evolution of Tulcea County in the analysed time period, which doubled its number of tourist reception structures during the analysed time period.

Figure no. 155 Total tourist reception structures, by counties, South-East Region – Number
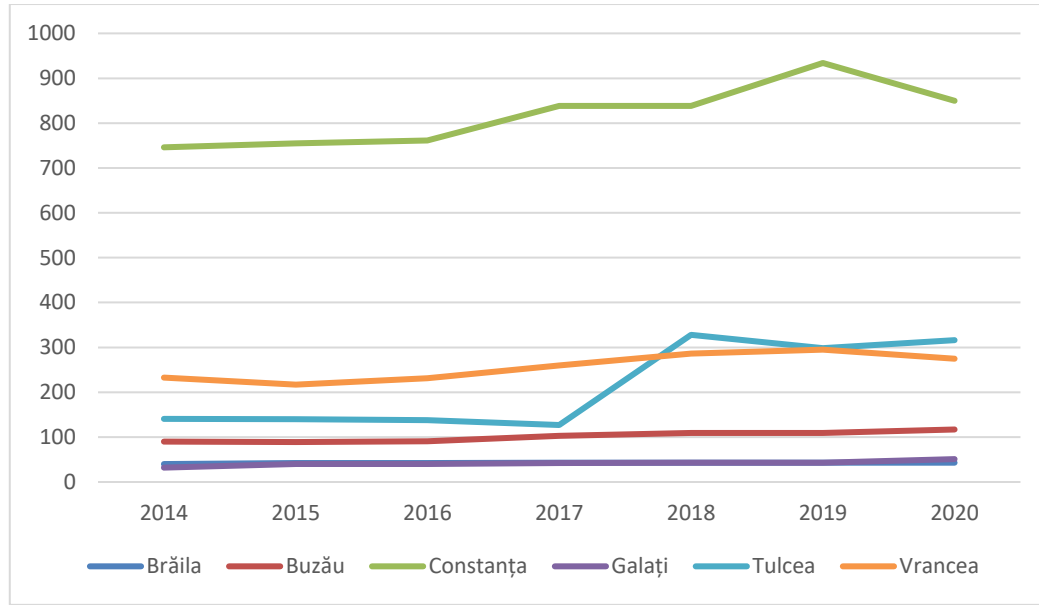
Source: NIS, 2020

The analysis of the distribution of tourist reception structures on the counties related to the South-East Region reveals that, at the level of 2020, Constanța county remains the leader at the region level, the county comprising 51 % of the total tourist reception structures at regional level. On the 2nd place is Tulcea – another county with special tourist importance from the regional level, which comprises 19 % of the total tourist reception structures at regional level. At the opposite pole are the counties of Brăila and Galați, both with 3 % of the total tourist reception structures at the regional level.

Figure no. 156. Distribution of tourist reception structures by counties, South-East Region – Number – 2020

Source: NIS, 2020

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Constanța county also dominates in terms of the existing tourist accommodation capacity measured as the number of available accommodation places. As of 2020, Constanța had over 80 % of the total tourist areas at regional level, followed by Tulcea, with 7 %. This is mainly due to the positioning of Constanța County, which is the most important county in terms of coastal tourism in Romania. However, the untapped potential of Tulcea County is constant, with direct access to the Danube Delta, the latter being the second largest river delta in Europe. Investments in tourism at Danube Delta level can increase both the tourist accommodation capacity in Tulcea County, as well as the interest of foreign/Romanian tourists in this area with a high tourist potential.

Figure no. 157. Distribution of tourist accommodation capacity by counties, South-East Region – Number – 2020
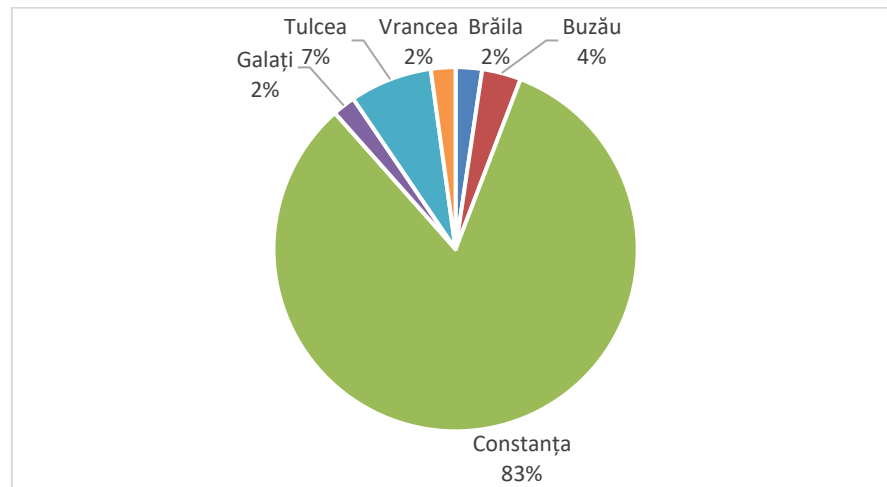
Source: NIS, 2020

Also, according to the number of arrivals of Romanian tourists, it is noted that the South-East Region is among the most important tourist areas of Romania. Although the Centre Region is constantly on the first place at national level, it is important to mention that this Region incorporates an important part of the important areas regarding mountain tourism, such as Bucegi Mountains, Harghita Mountains, Târnavelor Plateşul, Piatra Craiului Mountains, etc.

On the other side, the South-East Region incorporates the tourist important areas of the Romanian seaside, as well as the Danube Delta. Resorts such as Eforie Nord, Mangalia, Costinești, Neptun, Mamaia, Techirghiol are important resorts, where both traditional tourism and leisure tourism can be practiced. The Danube Delta is also a very important area for tourism in the South-East Region, which can attract tourists interested in water sports, as well as tourists interested in practicing other activities, such as sports fishing.

The tourist development potential of the Region can be seen from the constant increase in the number of arrivals of Romanian tourists in the South-East Region. While in 2014, a total of 1,091,363 Romanian

tourists arrived at the level of the region, this number increased significantly, with 1,782,430 arrivals of Romanian tourists representing an increase of 63.32 % in 2019.

Figure no. 158 Arrivals of Romanian tourists, by Development Regions – Number —
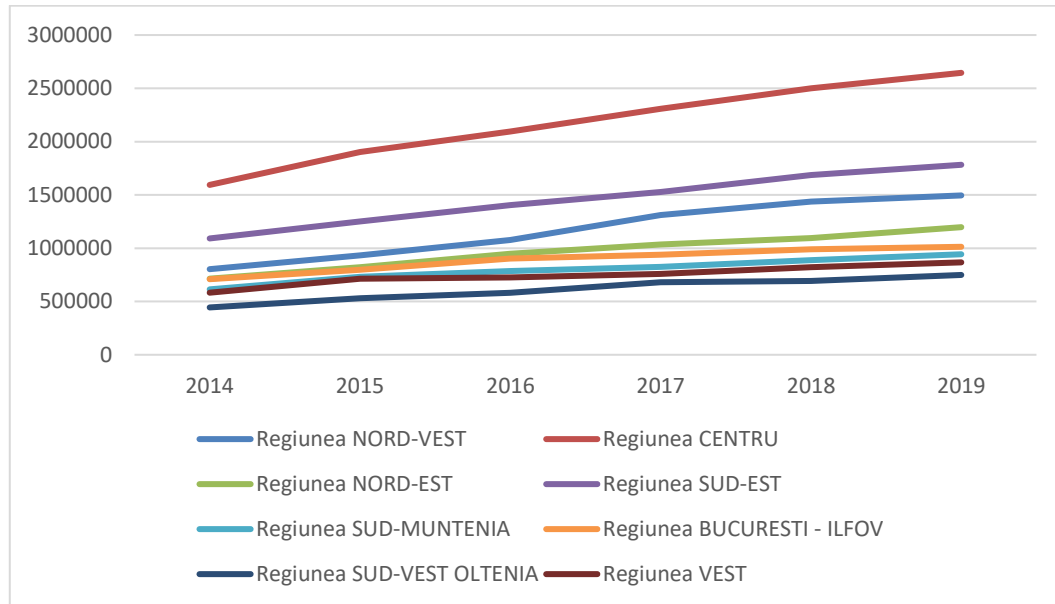
Source: NIS, 2020

In terms of the number of arrivals of foreign tourists, statistics change substantially. The Bucharest-Ilfov region ranks 1st in terms of the number of arrivals of foreign tourists, especially due to the easy access of tourists to this region, the Henri Coandă airport being the largest airport in Romania in terms of annual passenger traffic.

If the South-East Region is very attractive to the Romanian tourist, it loses its attractiveness in terms of foreign tourists. Thus, South-East Region is ranked 7th at national level in terms of arrivals of foreign tourists, followed only by the South-West Oltenia Region, the latter ranking last at national level.

Indeed, at the level of 2019, the South-East Region accounted for only 4.32 % of the total arrivals of foreign tourists at national level. Thus, the tourism potential of the South-East Region can be realised by prioritising the growth of the region's visibility at European and international level.

Figure no. 159. Arrivals of foreign tourists by Development Regions – Number —
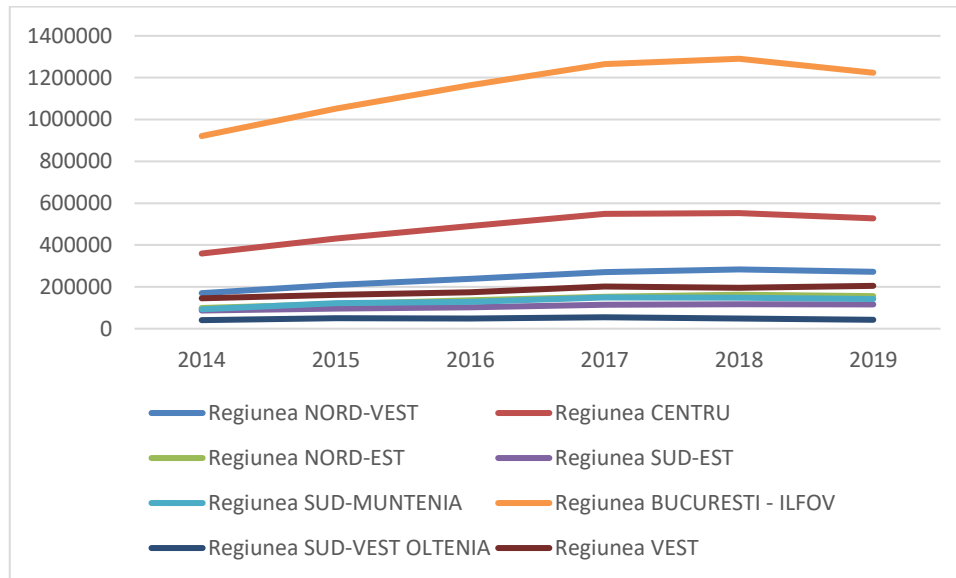
Source: NIS, 2020

The market

According to the World Economic Forum (WEF) report in 2019, Romania ranks 56th in the ranking on the competitiveness of tourism in 140 countries, improving its score on almost all the indicators considered. Even so, there are large gaps between tourism services offered by other countries and those in our country.

At the level of the South-East Development Region, the index of net use of accommodation places in total tourist reception structures was 42.6 in 2019, above the average recorded by Romania of 34.2. The highest index was registered in Constanța County (49.3), followed by Brăila County (37.8), Tulcea County (31.9), Galați County (28.5), Vrancea (16,7) and Buzău (16,1).

Innovation intensity in the field

The intensity of innovation in tourism activity in the South-East Region is low. However, there are several projects that have put their mark on tourism change. For example, the first water tourism route from our country has materialised in the Danube Delta as "With Canotca in Delta: innovative Methods of Interpretation of Nature". The project aimed to create a themed water "path" on the quiet channels in the Crișan area through innovative methods of audio and graphic interpretation (use of audio guides

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and leaflets). The circuit allowed exploration of the biological diversity of the Delta by practicing a slow tourism with Canotca.

Availability of qualified human resources in the field

The tourism industry in the region is currently experiencing a shortage of well-skilled labour. In addition to schools with programs specific to the tourism industry, a number of training projects for tourism employees are being carried out at the level of the region, such as:

- "EcoAdapt – The adjustment of employees to the dynamics of economic sectors with potential for intelligence specialisation – South-East Region" and is implemented by Tourism, Hotel and Restaurant Consulting Group SRL – THRCG, as a beneficiary.
- The project "Qualification, Skills, Competitiveness in the South-East Region" (contract POCU/464/3/12/128144).The project takes place in all 6 counties of the South-East Development Region. The National Tourist Education Center S.A., as Partner 1, will organise vocational training courses.
- The project "Professionals in Top Tourism (PRO TOP)" whose general objective was to improve the skills of entrepreneurs, managers and employees from the human resources departments working in the field of tourism and ecotourism, in the Central and South-East regions.

PILLAR III.Smart society and regional economy through digital transformation

Pillar objective: Supporting the economic and social development of the region by applying new technologies in key competitive areas.

Priority III.1. ICT – Information and communication technology

Importance of the area in the regional economy

Digitisation is one of the most visible and felt phenomena of this decade, with the uptake of digital technologies quickly, almost unaware of it. Just as the first three industrial revolutions have demonstrated that technology has a major impact on the labour market and the business environment, we expect that the current phenomenon of accelerated digitisation of the economy, known as the Fourth Industrial Revolution, will have positive effects for competitiveness, increasing productivity, but also a noticeable impact on the labour market, through the disappearance of jobs and the emergence of completely new occupations.

The gross added value of information and communication activity at the level of South-East Development Region in 2017 (existing available data) was 1,386.5 million lei, representing only 1.8 % of the total gross added value. However, the potential for development of the sector in the region is significant and must be further supported, not necessarily as an area of smart specialisation in itself, but more likely as a

cross-cutting secor, since it contributes to the implementation of RDI in all the other sectors of economic activity.

At the level of the South-East Development Region, in 2019, there were 1,514 companies operating in the field of information and communications, representing only 2.4 % of all registered enterprises in the region. Of these, most were in the counties of Constanta and Galați, favored by the existence of university centers with specialised faculties, as well as by the software park in Galați. The number of employees in the field of information and communications was 9,800, of which 4,500 women. 6,900 people worked in ICT in the counties of Constanta and Galați, representing 70.4 % of the total ICT employees in the region. The turnover from local active units in the field of information and communication was 1.583 million lei in 2018, with the highest values in Constanta and Galați counties.

All 11 clusters operating at the level of the region are active and they integratie innovative technologies into the projects carried out. However, there is also a cluster specifically dedicated to ICT, the "Cluster of the Lower Danube" Galați, established in 2015, which aims to develop sustainable growth of its members, increase the capacity of research and development and stimulate cooperation between R & D and innovation institutions (IDUs) and enterprises, as well as increasing business access to RDI. It currently has 37 members.

The software park in Galați is another regional entity with a significant impact on ICT in the region. The Scientific and Technological Park in Galați aims to contribute to the development of the industrial sector of cutting-edge technologies, facilitating the transfer of technology, as well as creating a viable alternative on the labor market in the South-East Region.

The market

The Romanian IT market is forecast to reach a CAGR (Compound Annual Growth Rate) of 3.1 % in the period 2017-2021, up to 9.9 billion lei in 2021. For the sales of IT services in Romania, between 2017 and 2021, a CAGR is estimated to be 7.7 %. Software sales in Romania are estimated to grow from 1.5 billion lei in 2017 to 2.1 billion lei in 2021, a CAGR of 9.0 %. Almost half of the turnover produced at national level in ITC (48 %) is driven by software product development.

According to the NIS, in 2019, 75.7 % of households in Romania had access to internet at home, in growth compared to 2018 by 3.3 percentage points, 61.8 % of them concentrated in urban areas. From a territorial point of view, at the level of 2019, internet connection was more widespread in the Bucharest-Ilfov region (almost 6 out of 7 households had access to internet from home), followed by West, North-West and South-East Regions.

The lowest shares of households with internet connection are recorded in North-East Region (70.6 %) and South-Muntenia (70.9 %). Significant increases compared to the previous year were observed in

the following regions: Centre (7.5 percentage points), South-East (6.0 percentage points), North-East (5.5 percentage points), South-Muntenia (4.3 percentage points), South-West Oltenia (3.9 percentage points) and West (2.1 percentage points).

Households who opted for fixed broadband connections to the Internet in 2019 come from the Bucharest-Ilfov region (15.6 %), North-West (14.1 %) and South-Muntenia (14.0 %). Mobile broadband connections were common among households in the North-East Region (17.0 %) and South-Muntenia (14.8 %).The narrowband connection, especially in the Bucharest-Ilfov regions (17.5 %) and South-East (15.8 %), has had a very high impact lately.

However, a significant proportion (24.3 %) of households in Romania do not have access to the internet at home, the reasons being different: lack of skill, increased costs, lack of interest.

On the other hand, statistics show that the Internet, an information and communication space, is of increasing interest to all kind of populations. Thus, in 2019 compared to 2018, the share of internet users aged 16-74 increased by 3.5 percentage points, reaching around 12.1 million people. In 2019, the majority of people are current users, 89.4 % of 16-74-year-olds using the Internet in the last 3 months prior to the investigation, 77.0 % of whom use this instrument daily or almost daily, and 20.2 % with weekly frequency.

Of all people who have accessed the Internet in the last 12 months, the share of those interacting with public authorities or services for personal purposes accounted for 14.6 %. Of these, 74.7 % sought information from public authorities' websites, 55.6 % requested the download of official forms and 47.8 % wanted to submit completed forms. These activities are mainly required in urban rather than rural areas (18.3 % versus 9.1 %).The level of interest for these interactions with public authorities is higher in the Bucharest-Ilfov Regions (23.8 %), Centre (16.8 %) and South-West Oltenia (16.5 %) and is lower in the South-Muntenia regions (10.4 %) and North-East (11.4 %).Internet users accessing authorities' websites and using public services are more common among people aged 35-54 (16.6 %) and in the 16-34 age group (14.1 %).

Although e-commerce has a relatively lower representation compared to other purposes for which the Internet is used, it can be noted that the share of 16-74 years-old who have resorted to online shops services to order and/or buy products and services (reported to 16-74 years-old who have ever used the internet) has steadily increased in recent years, reaching a maximum of 43.5 % in 2018. However, in 2019 there was a slight decrease (to 42.4 %).

Innovation intensity in the field

In relation to the development potential of the ICT industry in the region, the degree of innovation in the area remains low. However, the software park from Galați offers specialised services of business

assistance services for innovation and technology transfer, technological information services, technological audit, technological vigilance and forecasting, assistance and consultancy services for the development of experimental models and prototypes, identification of partners from academia and research, ensuring access to specialised databases.

Also, among the objectives of the ICT Cluster "Dunarea de Jos" Galati, are to harness the potential of information and communication technologies and its application in the public sector (administration, education, health) and private (enterprises, citizens); creating premises for increasing the competitiveness of ICT companies based on knowledge intensive use; increasing the regional competitiveness of IT in education; representing ICT interests to state bodies; creating mechanisms for collaborative approach to large international projects; supporting ICT entrepreneurs and SMEs in the region; strengthening cooperation between the various actors in the information and communication technology sector, the exchange of information and ideas, and joint activities.

Support for the implementation of Information and Communication Technology (ICT) in the region can also be achieved through the development of Digital Innovation Hub (DIH).There are currently 3 such centres operating in the region: CiTyInnoHub in Constata, Danube DIH in Galati and Digital Innovation Hub South East Romania. The role of these centres is to support firms in the process of digital transformation by providing testing facilities, skills and training, investment support and networking within a digital innovation economic system.

Availability of qualified human resources in the field

University centres in the region also train specialists in the field of information and communication technology who can meet labour demand in the region. These graduates can also benefit from adjacent vocational training programmes and internships in private ICT organisations.

I.4. SWOT analysis

The SWOT analysis is an essential step in the process of developing the Regional Smart Specialisation Strategy, necessary to define and substantiate future investment priorities in the field of research, development and innovation.

The SWOT analysis was developed on the basis of the findings resulting from the analysis of the regional context and the innovation potential of the South-East Region. On one hand, the SWOT identifies the strengths and weaknesses that define the region, and on the other hand the opportunities that can be used to reduce or eliminate identified weaknesses and external threats that may affect the future development of the region.

Strengths:	Weaknesses:
• GDP growth in the South-East Region by 14,33 % over the period 2014-2017; • GDP/inhabiting growth at the level of the South-East Region in the period 2014-2017; • Increase in GAV by 20,66 % over the period 2013-2017; • Important contribution of regional GAV to the national GAV, in terms of agriculture, forestry and fisheries and the construction sector (place 2 and 3rd place at national level in 2017); • The increase of the activity rate in the South-East Region between 2014 and 2019 from 63 % to 68 %; • Increase in the employed labour resources in 2019, compared to 2018, by 1 percentage point; • Low unemployment rate recorded in 2018, in Constanta county, below the national average (2.7 %, compared to the national average of 3.3 %); • The increase of the number of local active units in the industry of professional, scientific and technical activities, from 4.473 units at the level of 2014, up to 5,407 active units at the level of 2018; • 42.69 % increase in the number of newly created active enterprises in the South-East Region in 2014-2018; • The presence of 7 higher education units in the region; • In the period 2014-2016, at the level of the South-East Region, the share of innovative enterprises was 16.9 %, representing the highest level of innovation of all Romanian development regions; • Existence and functioning of industrial clusters and parks, at the level of the South-East Region;	• The decrease in the GDP share of the Region from national GDP in the period 2014-2017, from 11.26 % to 10.26 %; • The lower position held by the South-East Region at national level in terms of regional GDP. Thus, at the level of 2017, the region was 6th in terms of regional GDP, although in 2014 it was ranked 4th; • The existence of a relatively low value of regional GDP of South-East Region, at the level of 2017 ranking 5th at national level; • Decrease in the share of GAV at the level of South-East Region, compared to the GVA at national level - in 2017, compared to 2013 (from 11.26 % to 10,24 %); • The decrease of the civil active population of the South-East Region between 2014 and 2019, from 1,059.60 thousand in 2014 to 997.80 thousand people in 2019 (representing a decrease of 5.8 %); • The region was ranked last at national level in 2019 in terms of urban activity rate; • At the level of 2019, South-East Region had the highest national unemployment rate (6 %); • Slight decrease in the number of SMEs in the period 2014-2018, at South-East Region level, from 11.41 % of total SMEs at national level in 2014 ,to 10.97 % in 2018; • At the level of 2019, the average monthly salary in the South-East Region was below the national average (which is 85.4 % of the average monthly net salary recorded at national level); • Low rate of foreign direct investment in the South-East Region at the end of 2018 (4.2 %, ranking the region 6th at national level);

- The increase of the number of employees in the R & D activity between 2014 and 2018, at the level of the South-East Region;
- Existence, on the territory of the South-East Region, of 5 research and development institutes;
- The existence, on the territory of the region, of the most important shipyards in Romania, namely Constanta, Midia, Mangalia, Brăila, Galați and Tulcea;
- The South-East Region is an important agricultural area, with tradition in this sector and geographical features favourable to agriculture (this is the first place in the country in terms of the area of fruitful vineyards and has the second largest area at national level in terms of harvesting wheat, rye, maize, etc.;
- The largest areas for aquaculture (65 % of the national area) are concentrated in the South-East Region;
- The South-East region, due to its geographical characteristics, has a high tourist potential - seaside tourism, spa tourism, mountain tourism or niche tourism, such as winemaking, can be practiced.

- At the level of 2018, the South-East Region was the region with the lowest expenditure on R & D at national level.
- The decrease in the number of patents registered in 2019, at the level of the South-East Region, compared to the period 2015-2018;
- The low innovation capacity of the South-East Region according to the RCI index (European Regional Competitiveness Index);
- The South-East Region has a low competitiveness potential, according to the Competitive Potential Index, calculated at the level of 2017;
- Decrease of the number of innovative SMEs in the South-East Region by 8.73 % and the number of innovative large enterprises (IMs) - by 15.91 % between 2014 and 2016;
- South-East Region's poor performance in digitalising and widening the gaps with the rest of the regions

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Opportunities:

- Implementation of the National Strategy for Research, Innovation and Smart Specialisation 2021-2027;
- The existence of non-reimbursable funds for smart specialisation and digitisation in central public administration through the Smart Growth, Digitalisation and Financial Instruments Operational Programme (POCIDIF);
- Implementation of the Fair Transition Operational Programme for the most affected counties of the country, including Galați County

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Threats:

- Demographic phenomena of ageing and emigration, with an impact on the specialised labour force in the region;
- Deepening the socio-economic gaps between the development regions and the counties of the South-East Region;
- Low uptake of grants for smart specialisation, digitisation, research, development and innovation;
- Low private interest in investment in R & D and innovation activities.

(among the priorities of the programme are the development of entrepreneurship, SMEs, research and innovation and digitisation); • The existence of non-reimbursable funds to finance smart specialisation, including research, digitisation of SMEs, business support structures, innovation and technology transfer entities, digital innovation centres, SME production and digitisation activity in central government, by accessing ROP SE 2021-2027, Priority Axis 1 – A competitive region through innovation, digitisation and dynamic enterprises; • Involvement of members of the quadruple helix in the development process of the South-East Region.	

I.5. Conclusions of the analysis

A key issue emphasized at the level of South-East Development Region in recent years concerns the transition from the objective of competitiveness based on labour, natural resources and investment, to innovation, the latter assuming the development of research capacity in areas of high technology generating added value, with the potential to propagate and engage other productive sectors. Research and innovation have a direct effect on job creation, economic development and hence on improving quality of life.

The analysis developed in this chapter on the basis of statistical information, carried out for the most important socio-economic indicators and indicators related to R & D and innovation, highlights progress at the level of the South-East Development Region, which is still below the national average. However, the region has the potential for economic and social development in recent years, especially as a result of the fact that the mechanisms and governance framework have already been created since 2017, when the first Smart Specialisation Strategy was developed and the Regional Innovation Consortium was established.

The analysis of the indicators, presented in the previous sub-chapters, reveals that the Gross Domestic Product (GDP) of the South-East Region increased by 14.33 % in the period 2014-2017. However, the region's GDP as a percentage of national GDP decreased by 1 %, in the same period, the South-East

Development Region being thus surpassed by the Central and North-East Regions. At regional level, Constanta County has been the most developed county in the region in recent years, contributing with 41 % to the region's GDP in 2017. Analysing the South-East Development Region's position at national level in 2017, it occupies the fifth position in terms of value of regional GDP in the average at national level, being surpassed by the following development regions: Bucharest-Ilfov, West, Centre and North-West, which ranks the region at an average level of development, compared to the other development regions of Romania.

Over the entire time horizon analysed, the share of regional Gross Added Value (GAV) increased by 20.66 %, with an average growth of 5 % per year. Although at the level of 2017, the share of GAV of the South-East Region of national GVA was 10.24 %, it recorded a decrease of just over 1 percentage point from the value recorded at the level of 2013. Constanta county occupies the first place in the field of GAV, and at the level of 2017, the sector with the largest contribution to the formation of GAV at national level is the industry sector (except for the manufacturing and construction industries).

At the level of the South-East Region, between 2014 and 2018, the number of local active units increased by 8.4 %, and the region's position in relation to the other development regions of Romania remained relatively unchanged. If in 2015, it represented 11 % of all local active units at national level, while the same share can also be observed at the level of 2018.

As regards the evolution of the economic structure of local active units, it is noted that at the level of the South-East Region, although the wholesale and retail industry remained the most important industry in terms of the actual number of local active units, the professional, scientific and technical activities industry experienced a significant increase in the number of local active units, of 17.28 % in the 2014-2018 time horizon. Also, during the same period, the South-East Development Region experienced a significant increase, of 42,69%, in the registration of new active enterprises. The number of regional new enterprises experienced some fluctuations between 2014 and 2019, with an increase of 13.51% over the period 2014-2016, followed by a significant decrease in the next two years of 20.66%.

The analysis carried out on innovative firms in the region reveals that there has been a decrease in the number of innovative SMEs in the South-East Region, by 8.73 % between 2014 and 2016, while the number of innovative large enterprises (IMs) decreased by 15.91 % over the same period. As regards the breakdown by type of activity, companies active in industry are, at the level of the South-East Region, more innovative compared to the service providers. Indeed, at the level of 2014, companies in the industrial sector accounted for 57.67 % of all innovative enterprises in the South-East Region. From the perspective of breakdown by type of innovation, enterprises from the South-East Development

Region which introduced product and/or process innovations were ranked first, with a share of 7.4 % of all enterprises, followed by organizational and/or marketing innovations.

At regional level, the working population (employed population and registered unemployed) is represented by 956 thousand people. The activity rate is 67.7 %, which ranks the South-East Region on the 5th place after the South-West Oltenia region (69.2 %). Most of the work resources at the level of the South-East Region, respectively 431 thousand people, were concentrated in Constanta County, and the smallest part in Tulcea County.

The civil active population of South-East Region decreased by 5.8 percentagepoints in the period 2014-2019, and at county level, the highest value of the civilian active population was registered in Constanta County, being 3.5 times higher than the value recorded in Tulcea County at the level of 2019.

The activity rate recorded a slightly upward trend in the South-East Region in the analysed period, increasing from 63 % in 2014 to 68 % in 2019. From the perspective of the distribution of the employed population according to the sectors of activity, it can be observed that 25 % of the civilian population in the region is employed in agriculture, 17 % in manufacturing, and 15 % in wholesale and retail trade, repair of motor vehicles and motorcycles.

At national level, South-East Region ranks 6th at the level of 2019 in terms of human resources employment rate (64 %), registering higher values only compared to the Centre Region 63.9 %.From the perspective of the employment rate recorded at the level of the counties of the South-East Development Region, it maintained the same upward trend between 2010-2015. The county with the highest employment rate recorded at the level of 2015 is Vrancea County (68.1 %), and the lowest employment rate in the region is recorded at the level of Galați county (54.7 %). It is also worth noting the considerable increase of this indicator in the counties of Tulcea, Vrancea and Brăila. At the level of the South-East Region, Constanta county registered in 2015 the lowest unemployment rate compared to the other counties of the region of only 3.6 %, thus being below the national average.

The South-East Development Region has recorded an increase in the average number of employees since 2014, having experienced a period of fluctuations between 2010 and 2012, as a result of the economic crisis that had started in 2008. The county with the highest share of employees is Constanta.

Also, at the level of 2019, the average monthly salary recorded in the South-East Development Region was 2,551 lei, and from the analysis of earnings by economic activity, it can be observed that the sector with the highest value of the average monthly salary was the production and supply of electricity, gas, hot water and air conditioning, which has an average monthly salary level of 5.093 lei net. The other areas of higher earnings at regional level are in the public administration and social security sectors of the public system, extractive industry and health.

At the level of the South-East Development Region, total foreign direct investment accounted for 4.2 % (3.447 million euros) of the value of foreign direct investments at national level in 2018. Constanta County has the highest potential for economic development as a result of foreign direct investments that were realised at county level (1.852 million euros), representing 54 % of the total foreign direct investments made in the South-East Region in 2018. At the same time, the share of investment in services increased from 24 % in 2010 to 31 % in 2018.

From the perspective of the indicator regarding total exports at the level of the counties of the South-East Development Region, the situation was as follows: Constanta registered in June 2020 a value of 97.554 million euros from export, registering a decrease in the value of exports compared to the same month in previous years (2014-2019), while the county with the lowest value of exports is Tulcea. At regional level, the groups of base metals, minerals, vegetables, textiles and food record the highest value of exports. Total imports at the level of South-East Development Region counties follow the same evolution as total exports, positioning Constanta county first and Tulcea on the last position at regional level.

Regional disparities in R & D spendings are very large, the Bucharest-Ilfov Region being the one that registers the highest values, and the differences between it and the rest of the regions are significant. The South-East Development Region accounts for the lowest expenditure for the whole period analysed (2014-2018). The trend is slightly upward, but this very low growth rate deepens the already created inequalities compared to the rest of the regions. A more detailed analysis of expenditures at the level of the counties in the South-East Region reveals that there are counties where there were lower values in 2018 compared to the previous year (Brăila, Constanta, Vrancea) and that none of the counties experienced a steady growth, recording at least one year in which the expenditure values were lower than in the previous year.

At regional level, the number of R & D employees has increased in recent years, with the highest value of this increase occurring between 2017 and 2018, when 189 people joined this area. It is noted that the period of increase in the number of employees at regional level coincided with the period of decline in the number of employees at national level, with the region in contradiction with the national dynamics in the field of R & D.

The region's entrepreneurial dynamics is also highlighted by the situation of start-up's status year after its creation. In practice, survival over a period of at least one year suggests both that the organisation has solid activity and their potential to create new jobs in the future. In this respect, it can be noted that at the level of the South-East Development Region the largest share of active SMEs is held (69.4 %), but in recent years the share of inactive enterprises increased from 14.2 % in 2014, to 25 % in 2018. Only 5.6 % of businesses created the previous year were abolished, significantly lower in 2018 than in

2017 (12.6 %). The profile of the entrepreneur in the South-East Region has changed somewhat in recent years, justified by national programmes to support young entrepreneurs. Thus, if in the years 2014-2016, most business founders were between 30 and 39 years old, after 2017 the percentage of people up to 30 years of age started to grow. Thus in 2018, 30 % of the founders of new businesses were under 30 years old, 34 % were between 30 and 39 years old.

The benchmark carried out at the level of the study provides a number of relevant findings in relation to research, development and innovation activities in the South-East Region:

- A first overview of the evolution of regional competitiveness scores indicates that the South-East Region is experiencing a steady downward trend, observed especially since 2013, placing itself last in the analysis group considered.
- A comparison between the rest of Romania's regions also reflects a peripheral positioning of the South-East Region, with one of the lowest shares of companies involved in RDI projects, as well as with a low number of innovative companies.
- The South-East Region attracted EUR 6.860.000 (40 grants), out of which 27.3 % funds were attracted by private economic actors, 27 % by research organisations, 14.2 % by other public institutions (other than research and education) and 11.3 % by secondary or tertiary education institutions.

The quantitative and qualitative analysis carried out at the level of the South-East Region highlighted the existence of priority areas with smart development potential and specialisation, aiming at concentrating financial resources and other support mechanisms on this limited number of areas and creating national and international partnerships. In choosing the priority areas of smart specialisation, the 6 criteria presented in the RIS3 Guide Guide on Research and Innovation Strategies for Smart Specialisation were taken into account. The selection of smart specialisation areas took into account the characteristics of the development region, from an economic, social, political, demographic and historical point of view, as well as a detailed analysis of the actors with development and innovation potential and of locally relevant economic agents.

The areas were grouped on three strategic pillars: sustainable development through innovation, innovation in traditional industries and smart regional economy through digital transformation. Thus, following these preliminary analyses, the proposed smart specialisation areas (which will then be validated in the following activities involving key actors in the region) are:

- Engineering and shipping;
- The clothing industry;
- Agro-food and biotechnologies;
- Aquaculture and fisheries;

- Tourism;
- ICT – Information and Communication Technology.

The smart specialization areas identified for the South-East Development Region have a high potential for launching and capitalising on research, development, innovation activities of the region, creating an appropriate framework and context that capitalises on regional benefits and innovation created in all specific forms. Thus, the identification of these economic sectors with the potential to become regional areas of excellence allows orientation of development priorities in the field of RDI in the future, as well as highlighting the strengths that the South-East Development Region holds in each of these areas.

Chapter II. Regional Governance: ensuring participation and ownership

The European Union's main investment policy is represented by the regional policy, targeting all regions and cities in the European Union, supporting job creation, business competitiveness, economic growth, sustainable development and improving quality of life. The principle on which regional policy is based is solidarity, which in this way takes a practical form, with the inhabitants of the less developed regions having the opportunity to reap the benefits of the market.

Regional development is a process that requires the involvement of institutions, as well as close cooperation between public authorities, economic operators and social groups at all levels. The principles of regional development are based on the creation of partnerships, planning and good governance.

EU regional policy seeks vertical and horizontal integration so that, vertically, different levels of European, national, regional and local authorities are encouraged by the planning and programming system to communicate and coordinate in order to achieve concrete results and horizontally key stakeholders such as companies, social groups and civil society organisations are actively participating in the development process.

One of the challenges of regional development policy is to ensure the existence of appropriate administrative and institutional capacities involved in the regional governance process.

In the context of the definition of regional governance, a relevant concept is the quality of governance, a concept that has gained a central place in the discussions on the matter, being integrated into many of the documents relating to public administration and those that cross-sectionally pursue quality of life.

The relationship between the quality of governance and the quality of life of individuals in a country/region is one of determination, since the former is defined as an expression of how a government makes its' strategies, policies and development priorities of a country or region available to the citizens. In other words, it is very important how strategies and policies are implemented. Using indicators' evolution over time, efficiency, impartiality and transparency are assessed, illustrating the extent to which strategies and policies have produced added value and the quality of services offered in a context of development.

A very important element in understanding this concept concerns the way in which public goods and services are managed, which must be impartial, free from corruption, fair and effective. A high quality of governance of a country or region means that public administration provides inclusive services, with no discrimination against citizens based on sex, age, ethnicity, religion, sexual orientation, etc.

However, while considerable progress has been made towards developing tools and indicators to help assess the quality of governance, it continues to be subjective, in the sense that it is based on citizens' perception of the act of governance.

The public sector is the one concerned by the quality of governance, and depending on the level analysed, it may be national or regional, but the regional sector faces a data gap. Studies looking at the quality of governance at national level have shown that a higher quality of life is dependent on a higher quality of governance, but disparities at regional level are still poorly addressed due to the lack of disaggregated data.

The main indicator used to measure the quality of governance in the European Union is the European Quality of Governance Index (EQI).This indicator illustrates the perception of citizens from experience with public institutions, i.e. whether or not public sector services are offered impartially. The first publication of these data took place in 2010, repeated in 2013, the last available data being made public in 2017. Although a new publication was scheduled for 2020, it has not yet been accessible at the time of the drafting of the strategy.

In Romania, regional development policy is implemented through the eight Regional Development Councils and the eight Regional Development Agencies. In the 2021-2027 regional policy reform project, innovation is a key priority, with a tool for unlocking the innovation potential being the development and implementation of smart specialisation strategies. Smart specialisation strategies, as an essential element in the context of regional development and governance, are based on a number of general principles, represented by: concentrating public investment in R & D, identifying areas of specialisation following an entrepreneurial discovery process, focusing and allocating resources on specialised activities that provide a comparative advantage based on the differentiation of operations and products on global markets, coordination of multi-government and regional and interregional policies, by setting common objectives for the development of regional strategies and the appropriate allocation of public funds, the implementation of structural change models.

The Guide for the Development of Smart Specialisation Strategies, carried out by the European Commission in May 2012, underlines the importance of involving different types and categories of key actors in the process of realising smart specialisation strategies, stating that the RIS3 process must be interactive, regionally oriented and consensus-based".[45]

Thus, given that the smart specialisation process is based on a broad perspective on innovation, the concept of regional governance involves ensuring the participation of a wide range of key players, from public authorities, universities and research institutes, investors and businesses, to civil society actors,

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[45]Guide for Research and Innovation Strategies for Smart Specialisation (RIS 3), page 35

so that the governance model involves both the market and civil society. Although regional development is a collective effort, in which central institutions at national level are also involved, the regional level is the most important part of the process, given that key regional players are best aware of the territorial reality and existing needs.

The partnership framework for validation of information at regional level should be based on a bottom-up approach in order to identify and analyse existing needs in terms of research, development, technology transfer and digitisation.

At national level, within the Ministry of Public Works, Development and Administration, there is a structure that ensures:

- Operational coordination of regional operational programmes, according to Article 10 EO 122/2020;
- Operational coordination of the development of Regional Smart Specialisation Strategies 2021-2027, according to the Memorandum No. 20/4180/TG/08.03.2019 on: Measures necessary to fulfil the favourable condition "Good governance of the national or regional smart specialisation strategy", Criterion 1, measure: development of Regional Smart Specialisation Strategies 2021-2027
- The effective functioning of the entrepreneurial discovery process, according to the Memorandum No. 20/4180/TG/08.03.2019 on: Measures necessary to meet the favourable condition "Good governance of the national or regional smart specialisation strategy", Criterion 5 Effective functioning of the entrepreneurial discovery process;
- Operational coordination of the correlation between regional operational programmes and regional smart specialisation strategies, as well as between regional and national smart specialisation strategies a unitary framework for ex-ante evaluation of smart specialisation strategies by participating in the formulation of evaluation criteria, linking the monitoring and evaluation procedures of regional smart specialisation strategies, and linking them to those related to the national smart specialisation strategy.

At the level of the South-East Region, South-East RDA manages the elaboration, implementation, monitoring and evaluation of the RSSS SE.

South-East RDA will ensure the role of Management Authority for Regional Operational Programs 2021-2027, according to art.3 GEO 122/2020. As such, ADR SE has the ultimate responsibility, in relation to the European Commission, for the proper performance of its functions and obligations as MA of ROP.

South-East RDA Planning, Programming and Monitoring Office:

- Elaborates the South-East Regional Smart Specialisation Strategy, according to the Memorandum no. 20/4180/TG/08.03.2019 on: Measures necessary to fulfil the favourable

condition "Good governance of the national or regional smart specialisation strategy", Criterion 1, measure: development of Regional Smart Specialisation Strategies 2021-2027;

- Collect data/indicators for updating and monitoring the regional strategy;
- Manages the monitoring process of the South-East Regional Smart Specialisation Strategy by elaborating monitoring reports in collaboration with the members of the quadruple helix;
- Manages the evaluation process of the South-East Regional Smart Specialisation Strategy, an activity that will be carried out by external experts;
- Ensures the effective functioning of the entrepreneurial discovery process, according to the Memorandum No. 20/4180/TG/08.03.2019 on: Measures necessary to meet the favourable condition "Good governance of the national or regional smart specialisation strategy", Criterion 5 Effective functioning of the entrepreneurial discovery process (organisation of entrepreneurial discovery meetings);
- Ensures the correlation between regional operational programmes and the South-East Smart Specialisation Strategy.

Quadruple helix is the regional structure that meets in entrepreneurial discovery meetings and participates in identifying project ideas and smart specialisation areas.

The **Regional Development Council** is the deliberative regional body, without legal personality, founded on partnership principles, in order to coordinate the development and monitoring activities arising from regional development policies. The council also has the role of approving the strategy for smart specialisation of the region, in accordance with its tasks.

The Regional Development Council is composed of the presidents of county councils and one representative of each category of municipality, city and communal local councils in each county of the region.

From an organizational point of view, the Regional Development Council is headed by a president and a vice-president, rotating functions performed for a one-year term by the county representatives appointed by them. The president and vice president cannot be representatives of the same county. The Secretariat of the Regional Development Council shall be provided by the Regional Development Agency.

The Regional Innovation Consortium of the South-East Region (RIC SE) is a consultative structure, without legal personality, coordinated by the South-East RDA and consisting of representatives of academia, research, innovative enterprises, public authorities and civil society. The role of RIC SE is to endorse the South-East Regional Smart Specialisation Strategy, the realisation of the project portfolio related to the strategy and the participation in the monitoring of the strategy. CRI South-East operates in the form of working groups for the Entrepreneurship Discovery Mechanism.

The RIC SE comprises 41 members of the quadruple helix, consisting of representatives of research/education institutions, entrepreneurship, local public authorities and civil society representatives.[46]

Research/education:

- Accredited state higher educationinstitutions and their research structures;
- School inspectorates;
- Research and development institutes;
- Research and development institutes operating (head office or branch with legal personality) in the South-East Region;
- Institutes, research-development centers or resorts subordinated to the Romanian Academy or branch academies;
- Other R & D institutes, centres or resorts, organised as public or public law institutions;
- Other public or public law institutions which have as their object of activity and their research-development or legally constituted structures;
- Non-profit-making research and development institutes or centres recognised of public utility;
- Other research-development institutes, centers or resorts, organised as legal entities governed by private law, with no patrimonial purpose.

Entrepreneurship:

- Cluster management entities;
- Technology transfer entities;
- Firms that have RDI activity.

Public administration:

- Local public authorities;
- Metropolitan areas.

Civil society/users:

- Employers'associations and federations of areas identified as competitive in the South-East Region;
- NGOs/CCIA;
- LAGs/FLAGs.

The tasks of the Regional Innovation Consortium and its members are established in accordance with the provisions of the Methodology for the elaboration of the Framework Document for the Regional Research and Innovation Strategy for Intelligent Specialisation, issued by the Ministry of Regional

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[46]Regulation on the Organisation and Operation of the Regional Innovation Consortium of the South-East Development Region, http://www.adrse.ro/Planificare/ConsortiuInovare.aspx.

Development and Public Administration (MDRAP) in 29.06.2016, the implementation mechanism for Priority Axis 1 Promotion of Technology Transfer, Regional Operational Programme 2014-2020, issued by MRDPA in 08.06.2016:

a) participate and provide views, proposals and comments in the consultation process on the elaboration and updating of the South-East RIS3;
b) analyses the RIS3 South-East priority project portfolio;
c) monitor the South-East RIS3 strategy;
d) contribute to the identification of the information sources needed to monitor the South-East RIS3;
e) provides information on the projects implemented in the South-East Region in accordance with RIS3 priorities;
f) propose possible structural and legislative changes necessary for the implementation of the South-East RIS3;
g) inform the management of the institution it represents of the tasks and activities carried out under the CRI and ensure that its position in relation to the decisions, documents debated or developed within the CRI, is consistent with the official view of the institution/organisation it represents within the CRI;
h) disseminate to other institutions and organisations with which relevant information on the activity of the Regional Consortium, priorities and measures in the South-East RIS3 is in institutional relations.

The quadruple helix brings together partners from four relevant categories in the context of innovation: private environment, academia, public authorities and NGOs. The members of the quadruple helix are involved in the Entrepreneurial Discovery Process (EDP), a key and defining process in the context of RIS development and implementation3. The effective functioning of the entrepreneurial discovery process is carried out according to Memorandum No. 20/4180/TG/08.03.2019 on: Measures necessary to meet the favourable condition "Good governance of the national or regional smart specialisation strategy", Criterion 5: The effective functioning of the entrepreneurial discovery process.

Entrepreneurial discovery meetings facilitate the establishment of areas of specialisation and strategic priorities, with members of the quadruple helix engaging in the process of validating and restricting the proposed areas of specialisation.

Coordination between the regional and national levels in relation to the smart specialisation process will be achieved through the Coordination Committee for the Smart Specialisation Strategy (CCSI), which will ensure the correlation between national and regional levels and inter-regional linkage of

smart specialisation policies, including the analysis of regional and national entrepreneurial discovery processes and strengthening and updating the types of interventions to be implemented through smart specialisation funding programmes.

Also, the draft version of the National Strategy for Research, Innovation and Smart Specialisation 2021-2027 proposes to activate the National Council for Science, Technology and Innovation Policy (CNSPSTI), a consultative body of the Government, subordinated to the Prime Minister, in order to coordinate and link policies in the field of R & D and innovation policies at sectoral and regional level, within a national innovation system.

Chapter III. Developing a global vision for the future of the South-East Region

European context

Smart specialisation is a unique opportunity regarding the development of contemporary innovation policies and the support of territorial development. The European Union therefore supports the development of smart specialisation strategies in the Member States, both at national and regional level, by allocating the European Structural and Investment Funds and the Cohesion Fund. These strategies involve national and/or regional public authorities, together with private companies, higher education institutions and civil society in mutual collaboration and consolidation processes.

According to the programming documents at European level, as well as the financing framework for the period 2021-2027, the European Union proposes to support important areas in the current socio-economic context, such as innovation and the environment, by allocating funds at the level **of 5 main policy objectives**:

- **A smarter Europe (**by promoting innovative and smart economic transformation)
- **A greener**, carbon-free Europe,
- **A more connected** Europe (regional ICT mobility and connectivity),
- **A more social** Europe (implementation of the European Pillar of Social Rights),
- **A Europe closer to citizens** (sustainable and integrated development of urban, rural and coastal areas through local initiatives).

Thus, given the added value potential of smart specialisation and the fact that in the 2021-2027 programming period it will play a major role in regional and territorial development and long-term economic transformation, smart specialisation can stimulate growth through innovation in industrial transition regions and further integrate regional economies into European value chains. Smart specialisation also offers huge potential for the development of eco-innovation processes to address global environmental challenges.

Moreover, the specific objectives of the ERDF and the Cohesion Fund argue that **a smarter Europe can** be achieved through the following development policies, which support Romania's fulfilment of the favourable condition '*Good governance of the national or regional smart specialisation strategy*', related to the policy objective 1:

I. strengthening research and innovation capacities and the uptake of advanced technologies;
II. capitalising on the benefits of digitising processes for citizens, companies and public administration;
III. developing the growth and competitiveness of SMEs;

Contextualisation at South-East Region level

The Regional Strategy for Intelligent Specialisation of the South-East Region for 2021-2027 is based on the information contained in the socio-economic analysis and SWOT analysis, dedicated to the field. At the same time, strategic documents developed at European level (Europe 2020 Strategy) and national (Partnership Agreement, National Intelligent Specialisation Strategy, National Strategy for Research, Development and Innovation), as well as the analyses and studies conducted in the past for the South-East Development Region were considered in the elaboration of this document.

Thus, the strategy for smart specialisation of the region is built on a solid analysis of current regional assets and technologies and is based on the principle of partnership between businesses, public entities, civil society and knowledge institutions at regional level.

In order to develop the overall vision for the future of the region, a number of office research and field research activities were carried out, including key regional stakeholders (business representatives, academia, public authorities, NGOs, etc.) seeking a strategic approach to economic development through support for research and innovation for specific areas. In this respect, it was aimed at identifying areas with important strategic potential, developing governance mechanisms with stakeholder involvement, setting strategic priorities and using smart policies to maximise the knowledge-based development potential of the South-East Region.

Initially, in order to achieve the expected impact of the region's economic development, the smart specialisation strategy needs to focus on a limited number of areas with innovation potential, so that they are properly developed and harnessed in order to bring as much added value to the territory as possible. The areas of smart specialisation identified by specific methods of analysis and research are detailed at the level of Chapter 1.3 and include *Engineering and Ship Transport; The clothing industry; Agri-food and biotechnologies; Aquaculture and Fisheries, Tourism and ICT*.

The aim of this smart specialisation strategy is to identify those areas where the South-East Region can develop, by capitalising on the results of research, innovation and science, so that it significantly contributes to increasing the region's competitiveness and reducing its gap with other development regions. Smart specialisation priorities, which will be detailed in the following chapters, encompass areas with competitive potential, real or potential, which will directly contribute to increasing the level of innovation and development of the region by mobilising material and human resources in the field of research, thus capitalising on the specificities of the South-East Region.

Thus, it is intended that in the future the South-East Region will become competitive, by capitalising on the results of research, development and innovation and by creating long-term partnerships between

research organisations and the private environment that will become functional and that are centered around infrastructures and research programmes in the fields of science and technology. Building on the results of research carried out by academic institutions can activate an innovation-based entrepreneurial environment that will lead to the development of the region and its competitiveness.

The Smart Specialisationvision of the South-East Region, which is created for the 2021-2027 time horizon, aims to provide the overall context for regional policy makers, through which they can plan their future development actions, using appropriate tools and techniques, to steer development efforts towards those areas identified as having regional innovation potential. Thus, the vision aims to create a future scenario for the region, setting out its role and position in the future, with the fact that it must be broad enough to frame realistic priorities and specific methods of development, economic renewal and transformation of the region.

The development scenarios analysed for South-East Region are the starting point for developing an appropriate vision in the field of smart specialisation, which aims to underpin the proposed innovation priorities, i.e. the specific objectives associated with them. In this context, it was based on the analysis and adoption of one of the three categories of scenarios, according to the European Guidelines for the Development of Intelligent Specialisation Strategies (RIS3):

- Development based on current advantages (testing the results of science, application of state-of-the-art technology or mixing them);
- Socio-economic transformation (by conversion, identification of new borders);
- Catching-up: by creating knowledge-based capabilities/abilities.

Development scenario	Presentation of the development scenario
Development based on current advantages (testing the results of science, application of state-of-the-art technology or a mix between them)	Scenario 1 presents the development potential of the region starting from the current state of diversification of economic branches and maximising the current skills of the workforce present in this region, bringing in addition to the latest technologies of the moment, in order to increase the level of innovation and create a basis on which it can be built for future generations.
Socio-economic transformation (by conversion, identification of new borders)	The second scenario involves a diversification of economic development for the South-East Region by identifying new economic opportunities from both the business environment and the labour force. Turning the region's resources into high value-added products and services will also have positive effects on

Development scenario	Presentation of the development scenario
	the whole region, bringing competitiveness on a European and global scale. The region can thus ensure socio-economic sustainability at national level increasing GDP/inhabiting levels and bringing prosperity in the long term.
Catching-up: by creating knowledge-based capacities/abilities	Scenario no. 3 aims to reduce the development gaps within the region by catching up with other development regions of Romania, relying primarily on acquiring new skills for the workforce in the South-East Region. Knowledge-based skills of the workforce in other regions are a determining factor for the socio-economic development gaps compared to the South-East Region

Selection of development scenario at regional level

Taking into account the three scenarios that could be adopted for the smart development of the South-East Region presented above, as well as a number of factors that condition the implementation of this strategy at regional level (such as the current level of development of the region, the applicability of the scenario at region level, the proposed period of time for the implementation of the strategy initiatives), the most appropriate development scenario for the South-East Region has been identified based on the following table.

In order to be able to measure the relevance of each factor influencing the region's development, a scale of 1-3 has been used where 1 – little relevant, 2 – relevant to some extent, and 3 – extremely relevant.

Development scenario	The current level of development of the region	Applicability of the scenario	Time period concerned	Relevance of the scenario
Development based on current advantages (testing the results of science, application of state-of-the-art technology or a mix between them)	2	2	2	6

Development scenario	The current level of development of the region	Applicability of the scenario	Time period concerned	Relevance of the scenario
Socio-economic transformation (by conversion, identification of new borders)	2	1	1	4
Catching-up: by creating knowledge-based capacities/abilities	2	3	2	7

The analysis of the current context of smart specialisation in the South-East Region highlights the following main findings, based on which it is recommended to select the catching-up scenario vis-à-vis other development regions, resulting in the applicability of the scenario in the current context:

- Regarding the economic situation in the South-East Region, although the region's GDP experienced significant growth in the period 2014-2017 (+ 14.33 %), its share in national GDP decreased. Moreover, GDP/capita in the South-East Region, at the level of 2017, is ranked fifth in the hierarchy of development regions. At the same time, gross value added, although in the period 2013-2017 recorded an average increase of 5 % per year, in 2017 accounted for only 10.24 % of national GVA – down by more than one percentage point compared to 2013. The average net earnings in South-East Region (NSI data at the level of 2019) is the lowest, compared to other development regions, of only 2.630 lei, while foreign direct investments in the region are at 4.2 % of the total recorded at national level, ranking the region at the 6th position at national level.
- In terms of the workforce, the working population of the South-East Region occupies the fifth position at national level and the employment rate ranks sixth compared to the other development regions. However, the unemployment rate is below the national average (4.2 %, compared to 4.6 % at national level).
- As regards research, development and innovation, South-East Region has the lowest RDI costs at national level, with 5 R & D institutes. Moreover, although the number of employees in the sector is increasing, patent applications and brand registration have a downward trend in recent years. In addition, there is a slight decrease in the number of innovative SMEs in the South-East Region (by 8.73 % between 2014 and 2016) and the number of innovative large enterprises (MI) (decreased by 15.91 % in the same reference period).

Thus, the most appropriate development scenario proposed for the South-East Region envisages catching up with other development regions by creating knowledge-based capacities/abilities. At the same time, the scenario envisages developing integrated initiatives by involving all categories of

relevant actors at regional level, using and capitalising on newly acquired capacities/abilities in order to add value to their work and thus reduce the gap between regions.

The principle of creating knowledge-based capacities/abilities is documented in the literature at European level and is based on an analysis of the current **state of development, the ability to absorb new technologies and the current regional innovation capacity.**Moreover, in setting the projected targets for 2027, in addition to the region's characteristics and its development potential, the evolution of indicators over time – following the same development trend as the last years analysed – was taken into account.

Vision, mission and objectives of the smart specialisation strategy

In view of the previous findings, as well as the selected development scenario, the vision, mission and general objective of the Smart Specialisation Strategy focus on the notion of catching up the gaps of the South-East Region with other development regions, by integrating the principles of smart specialisation.

Vision — *South-East Region is aligned with national development trends and supports the improvement of capacities and skills of representatives of academia, public and private environment and civil society to develop and implement integrated smart specialisation actions, using a knowledge-based approach.*

The mission of the Regional Smart Specialisation Strategy**of the South-East Region 2021-2027 is to program and plan the proposed initiatives at the regional level, using an integrated and participatory approach, so that there is a favourable framework to generate the expected effects and results, in quantitative and qualitative terms, on smart specialisation at regional level.**

The overall objective is to bridge the existing gap with other Development Regions by integrating the principles of smart specialisation promoted by the European Union, while ensuring the favourable framework for key actors in the region which, by developing concrete initiatives for action in the areas of smart specialisation, produce a positive impact in relation to the sustainable development of the region.

General objective — Accelerating the development process by adhering to an integrated system of priorities and measures aimed at improving smart specialisation capacities and skills in the region			
SO 1 – Strengthenin gresearch and innovation capacities at the level of academia, public and private environment	O.S.2 – Increasing the competitiveness of areas with smart specialisation potential, by digitising processes and using information systems	O.S.3 – Development of human resources skills for smart specialisation, industrial transition and entrepreneurship	O.S.4— Adoption of advanced technologies in the areas of smart specialisation

The policy objectives selected to achieve the overall objective of the strategy follow the policies outlined by the European Union to support development towards a smarter Europe. Thus, the logic of intuition aims to improve the following main aspects: 1. Research and innovation capacity, 2. Digitisation, 3. Human resources, 4. Advanced technologies (KETs) with the following strategic objectives aimed at developing all areas of smart specialisation identified at regional level:

S.O 1 – Strengthening research and innovation capacities at the level of academia, public and private environment involves supporting institutions involved in RDI activities by promoting funding opportunities for these activities, facilitating cooperation between entities and implementation of implemented projects. The objective is to actively support public-private partnerships in order to increase the level of cooperation in the field of RDI.

S.O 2 – Increasing the competitiveness of areas with smart specialisation potential, by digitising processes and using IT systems involves taking steps to digital transformation in the competitive areas identified in the South-East Region. The objective assumes that competitive advantages cannot be achieved today without the widespread use of information and communication technology.

S.O 3 – Development of human resources skills for smart specialisation, industrial transition and entrepreneurship. This objective will support the training of staff involved in RDI activities in the areas of smart specialisation, both in the public and private sectors, encouraging entrepreneurial initiatives.

S.O. 4 – Adoption of advanced technologies (KET) in the areas of smart specialisation. This objective proposes that through concrete actions to support the financing of the uptake of advanced

technologies, all areas of smart specialisation should become competitive at international level, given the special potential at regional level.

Furthermore, in the context where the selected strategic objectives aim to develop all the areas of smart specialisation identified at regional level, the present strategy identifies a number of operational objectives, which in particular require the development of each smart specialisation area through specific priorities, measures and actions detailed at the level of the Action Plan.

The proposed operational objectives include:

- O.O.1 – Increasing competitiveness, developing innovative products and processes, in engineering and shipping and in the clothing industry;
- O.O.2 – Development through innovation in the agri-food sector, bio-technologies, aquaculture, fisheries and tourism;
- O.O.3 – Development of the regional economy through digital transformation.

Chapter IV.Strategic priorities for smart specialisation

The selection process of strategic priorities for smart specialisation in the South-East Development Region took into account the detailed analyses previously carried out in the process of establishing the smart specialisation areas in the region. 7 priorities were established for the areas of smart specialisation identified at South-East Region level and 4 cross-cutting strategic priorities, applicable across all areas of competitiveness. The priorities were thus set, on the one hand, to describe concrete measures and actions at the level of each area of smart specialisation, and on the other hand, through cross-cutting strategic priorities, the aim was to strengthen RDI activities through institutional support, digitisation and the uptake of advanced technologies and by improving the skills of the human resources involved.

The research and development and innovation priorities identified are validated both by the analysis of statistical data relevant to the region, by the survey of the most important economic actors in the region (with the quadruple helix) and by previous entrepreneurial discovery workshops.

These priorities have a clear economic and technical dimension. They can contribute to the economic and social transformation of the region by supporting diversification, modernisation and innovation in key areas for the region. The priorities were set in view of the concept of innovation considered in the broad sense, not only in the sense of absolutely new products, but also in the sense of new processes, new industries, social innovation, new business models and business practices.

The principle of granularity has also been taken into account in prioritisation, the objective being to identify that relevant level between sectors of activity and micro-activities where smart specialisation through R & D and innovation is possible. The critical mass and/or critical potential of some economic areas in the region were at the heart of the priority selection process. Through these priorities, the strategy aims to ensure that research and innovation resources reach critical mass and sufficient momentum to become independent, or critical potential through concrete measures, aimed at boosting human capital and knowledge infrastructure. Through priorities by areas of smart specialisation critical mass/critical potential can be achieved either internally within the region or through cooperation with other regions.

The overall objective of the strategy is to accelerate the development process by addressing an integrated system of priorities and measures aimed at improving smart specialisation capacities and skills in the region. It aims to bridge the existing gap with other development regions by integrating the principles of smart specialisation promoted by the European Union, while ensuring the favourable framework for key actors in the region which, by developing concrete initiatives for action in the areas

of smart specialisation, produce a positive impact in relation to the sustainable development of the region.

In order to achieve this overall objective of the strategy, a number of strategic priorities have been defined to support its implementation through specific, measurable, achievable, relevant and time horizon objectives. The priorities were divided into cross-cutting strategic priorities and strategic priorities by areas of smart specialisation.
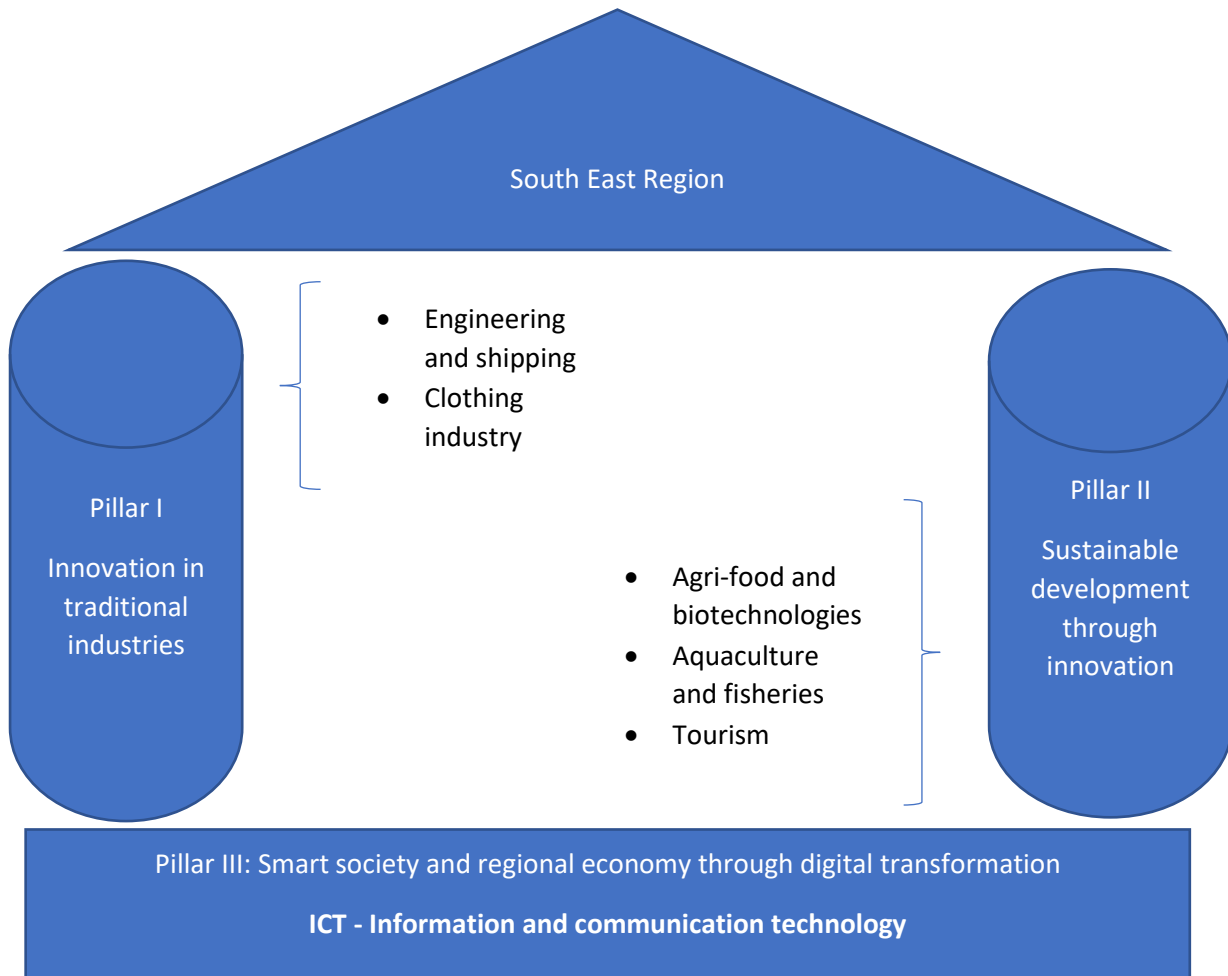
Cross-cutting priorities are:

1. Supporting the work of R & D and innovation organisations;

2. Digital transformation by supporting the deployment of Information and Communication Technology (ICT) in the areas of smart specialisation;

3. Developing human capital involved in R & D and innovation activities;

4. Supporting the application of Key Enabling Technologies (KET) in areas of specialisation.

These priorities refer to all areas of smart specialisation identified as relevant to the South-East Development Region and correspond to the identified strategic objectives. They support modernisation and organisational transformation through the implementation of modern technologies, focus on the development of collaborative entrepreneurship through clustering activities, all based on human capital capable of innovating and contributing to the global value chain.

Strategic objective	Cross-cutting strategic priorities
SO 1 – Strengthening research and innovation capacities at the level of academia, public and private environment	1. Supporting the work of R & D and innovation organisations
SO 2 – Increasing the competitiveness of areas with smart specialisation potential, by digitising processes and using information systems	2. Digital transformation by supporting the deployment of Information and Communication Technology (ICT) in the areas of smart specialisation
SO 3 – Development of human resources skills for smart specialisation, industrial transition and entrepreneurship	3. Supporting the work of R & D and innovation organisations
S) 4 – Adoption of advanced technologies (KET) in the areas of smart specialisation	4. Supporting the application of Key Enabling Technologies (KET) in smart specialisation areas

Strategic priorities by areas of smart specialisation

The overall objective of the strategy is reflected towards several strategic objectives, which meet the needs identified at regional level, as well as the development vision of the European Union for *a smarter Europe*.In this context, it was considered useful to identify operational objectives specifically aimed at developing each area of smart specialisation and directly supporting the achievement of the above-mentioned strategic objectives, thus establishing the regional development pillars.

Operational objective	Strategic priorities	Domain of smart specialisation
O.O.1 – Increasing competitiveness, developing innovative	Strategic priority 1. Supporting the application of innovative solutions in ship design, construction and	*Engineering and shipping*

Operational objective	Strategic priorities	Domain of smart specialisation
products and processes, in engineering and shipping and in the clothing industry.	repair in order to minimise negative environmental impacts	
	Strategic priority 2. Developing intelligent transport systems through the digitisation of ports and shipping	
	Strategic priority 3. Increasing the competitiveness of products and processes in the clothing industry through innovation	*Clothing industry*
O.O.2 – Development through innovation in the agri-food sector, bio-technologies, aquaculture, fisheries and tourism.	Strategic priority 4. Increasing the quality and quantity of food in the agro-food industry and biotechnologies	*Agri-food and biotechnologies*
	Strategic priority 5. Refurbishment in aquaculture and fisheries to support biodiversity and protect the environment	*Aquaculture and fisheries*
	Strategic priority 6. Supporting the implementation of innovative solutions in the provision and promotion of tourism services	*Tourism*
O.O.3 – Development of the regional economy through digital transformation.	Strategic priority 7. Supporting the adoption of SMART CITY solutions in the region	*Information and communication technology*

The strategic priorities listed above have been described below and materialised in a number of specific measures.

The naval industry is a traditional field in the economic activity of the South-East Development Region, with particular potential for development due to economic agents active in the field, investments made in recent years (especially in the construction and repair of ships), but also the highly qualified workforce. In the region there are the most important shipyards in Romania in Constanta, Midia, Mangalia, Brăila, Galați and Tulcea. The long tradition of shipbuilding has led to the development of educational programs that offer highly qualified specialists, sustained research activity and qualified design. Shipyards in Romania are generally specialised in shipbuilding for freight transport. The main types of vessels built here are bulk carriers, cargo tankers, cargo ships, fishing vessels, sea trailers, pushers and barges. The professionalism of Romanian shipbuilders is internationally recognised, with Romania being the preferred destination for the production of technical and commercial vessels in Europe. At the same time, the horizontal industry has experienced in recent years a spectacular dynamic that supports the performance of shipyards. All these arguments demonstrate the need for the smart specialisation of the South-East Development Region in the field of ship engineering and transport.

In the region there are numerous companies that have as their object the construction of ships and floating structures, the turnover achieved by the Romanian shipyards being about 650 million. Euro annually, representing about 5 % of Romania's GDP.The workforce employed in construction sites is around 10,000 people, with subcontracting firms on site platforms employing about 8,000 people. There are entities operating RDI in the shipping industry and education institutions for skills training in the region.

The main **measures** by which shipbuilding and repair can be supported for smart specialisation of the region are:

- Funding for R & D and innovation activities in the field of shipbuilding and repair for investments in innovative machinery, hardware and software tools;
- Facilitating the participation of innovative firms and R & D organisations from the region that carry out shipbuilding and repair activities in various international partnerships;
- Enhancing professional skills training activities for staff involved in RDI activities with the ultimate objective of developing shipbuilding and repair;
- Informing entities carrying out RDI activities on national and international sources of financing in the field of shipbuilding and repair;

Strategic priority 1. Supporting the application of innovative solutions in ship design, construction and repair in order to minimise negative environmental impacts

- Encouraging public-private partnerships for R & D and innovation in shipbuilding and repair.

Strategic priority 2. Developing intelligent transport systems through the digitisation of ports and shipping

Port and shippingactivity can bring added value to the South-East Development Region, with huge potential for creating jobs and attracting investments. In Europe, 74 % of non-Community goods are transported via ports. They are equally important for intra-European trade. Every year, 37 % of intra-EU freight traffic and 385 million passengers pass through ports. The EU port industry has a significant economic impact in terms of employment and activity in the port industry itself (direct impacts), downstream of the distribution chain (indirect impacts) and across the EU economy (induced impacts).The digitisation of ports is a priority for the region because, according to the European Commission, Europe's ports face 3 major challenges:

- A 50 % increase in goods handled in EU ports is expected by 2030. This growth is an opportunity for growth and more jobs: The Commission estimated that between 110,000 and 165,000 new jobs could be created in ports by 2030. However, Europe's ports must adapt to cope with an increase in traffic.
- The nature of the business is changing.
- There are very significant performance gaps between Europe's ports. Today, three of the best European ports, Antwerp, Hamburg and Rotterdam represent one fifth of all goods arriving at sea in Europe.

In Romania, goods loaded and unloaded in ports where seagoing vessels are operated amounted to 11.677 thousand tons, and shipping of containers amounted to 159 thousand TEU in the first quarter of 2019. The ports in which the largest volumes of goods have been recorded during the period under investigation are: Constanta, with a share of 78.1 % in total, Midia (16.2 %) and Galați respectively (4.0 %).

In order for our country to be competitive with the accelerated growth of goods handled in ports, the direction of digitalising shipping is absolutely necessary. All the more so since competitiveness, decarbonisation and digitisation are the guiding principles underpinning EU maritime transport policy. These principles aim to ensure that maritime transport remains an

attractive way for the transport of goods and passengers, making it even more environmentally friendly. It should also be a catalyst for investment and innovation.

The main **measures** to achieve the digitisation of ports and shipping and reducing the harmful environmental impact of smart specialisation of the region are:

- Facilitating investment in purchasing hardware and software tools needed to digitise ports and shipping;
- Supporting the participation of R & D and innovation entities from the region active in the field of the digitisation of shipping in various national and international partnerships;
- Support for training activities for staff involved in RDI activities with the ultimate aim of digitising ports and shipping.
- Informing entities carrying out RDI activities on national and international sources of funding in the field of the digitisation of ports and shipping;
- Support for public-private partnerships for R & D and innovation in the digitalisation of ports and shipping.

Strategic priority 3. Increasing the competitiveness of products and processes in the clothing industry through innovation

The clothing industry is an industry that has developed a lot in recent years in the South-East Development Region, due to the production of lohn system, but also the production of local brands. The future of the clothing industry will increasingly depend on the industry's ability to assimilate innovation in order to make the production processes more efficient and more flexible for organisational structures and commercial operations in close correlation with the evolution of customer needs. If the clothing industry initially developed on the basis of very low wage costs and an increased level of skill, the industry's actors now need to identify other competitive advantages. Technological transfer and innovation are solutions for solving the economic problems of local economic agents and for the permanent renewal of products and processes.

The main **measures** proposed to support innovations in the clothing industry are:

- Supporting investments for purchasing hardware and software tools needed in the production process in the clothing industry;

Strategic priority 3. Increasing the competitiveness of products and processes in the clothing industry through innovation

- The introduction of digital-fashioning use, i.e. the possibility for the customer to customise the product in the virtual environment, to be delivered as soon as possible;
- Supporting the use of functional innovative materials, biomaterials and textiles for medical use;
- Facilitating national and international partnerships for joint RDI activities;
- The production of multifunctional products through the application of nanotechnologies and microelectronics, which form a value chain using advanced materials with multisectoral applications, e.g. products with dirt removal properties, breathable Lotus nanostructures;
- Creation of technological incubators in the field of clothing and textiles, by capitalising on non-reimbursable financing opportunities;
- Development of dual education, through the implementation of partnerships between private companies and specialised vocational schools existing in the South-East Region;
- Financing of R & D-innovation projects in the field of textiles and clothing in order to create and test some experimental products, from the category of "smart textiles" (light shirt, energy clothing, sweater that checks the individual's health status, etc.).

Strategic priority 4. Increasing the quality and quantity of food in the agro-food industry and biotechnologies

The South-East Region is an agricultural area, traditionally, but also due to its geographical characteristics. Pedoclimatic conditions in the region favour the cultivation of field flats. The region ranks first in the country in terms of the area of fruitful vineyards. The production value of the agricultural branch was 15,256,105 lei at the level of 2018. The region has the second largest national area, cultivated with the main crops, after South-Muntenia Region, with a total area of 1,745,808 hectares in 2019. The largest areas were for wheat and rye cultivation (460.422 ha), maize (502.721 ha), oily plants (429.548 ha).In order to increase the added value of this economic activity, it is necessary to increase the technological intensity, identify innovative and sustainable ways of capitalising on resources, the use of biotechnologies. Biotechnologies can develop biotechnological methods, means and products to increase the quality and quantity of bio-resources in the context of climate change and the growing needs of high-quality food products. Biotechnologies have a positive impact on the environment, while contributing to the economic growth of a region.

Strategic priority 4. Increasing the quality and quantity of food in the agro-food industry and biotechnologies

Improving the performance of the agricultural sector through innovative businesses will have positive effects on micro and macro-economic stability, will help to ensure a balance between food consumption and agri-food security, increase the share of commercial farms and generate jobs, including the absorption of surplus labour from agriculture.

The main **measures** proposed to boost the use of biotechnologies in the agri-food field are:

- Supporting the application of digital technologies and robotisation in agriculture (agri-smart);
- Support for the establishment of hydroponic farms (hydroponic agriculture can be considered a more modern branch of agriculture, since it involves both growing vegetables and farming of fish (aquaculture).The nutrients produced by fish feed the plants for natural and rapid growth, while vegetables help to clean water. Fertilisers, pesticides or other chemicals need not be used;
- Setting up clusters/operational groups in the agri-food field at the level of the South-East Region;
- Supporting the use of waste from industry (paper) as compost for soil fertilisation and environmental protection.
- Support for the creation of safe, affordable and nutritionally optimised food products;
- Developing innovative value chains in the agri-food sector;
- Providing financial support to farmers, informing and training farmers to promote innovation and knowledge transfer in the agri-food sector;
- Support for the development of local, regional and national systems for conditioning, storage, processing and sustainable recovery of agri-food products;
- Supporting the development of regional and national refrigerating chains with a view to increasing the storage capacity of raw materials and foodstuffs;
- Improving research infrastructure in biotechnologies for the agri-food sector and fostering public-private partnership;
- Supporting the setting-up of businesses with research and development in biotechnology;
- Supporting investments for procurement of equipment and technologies necessary for the development of biotechnologies;
- Support for training activities for staff employed in organisations that develop and use biotechnologies;

Strategic priority 4. Increasing the quality and quantity of food in the agro-food industry and biotechnologies

- Facilitating partnerships with national or international entities active in the field of biotechnologies in which the RDI element is integrated, in order to ensure an exchange of experience and/or specialised staff;
- Supporting the implementation of trans-regional or transnational cooperation projects with other functional partner structures in the field of biotechnologies;
- Informing public and private research entities about available national and international funding sources for developing and strengthening RDI activities in biotechnology.

Strategic priority 5. Refurbishment in aquaculture and fisheries to support biodiversity and protect the environment

The Romanian fisheries sector includes aquaculture, marine and inland fisheries, as well as processing and marketing activities. The most important activity is freshwater aquaculture, followed by inland fisheries. Inland fishing is more developed than coastal fishing on the Black Sea.

The largest areas for aquaculture (65 % of the national area) are concentrated in the South-East Region. Marine fishing activity in the Black Sea increased by more than 10 times, from 443 tonnes caught in 2008 to 4,842 tonnes in 2015.

Aquaculture and fisheries cannot be internationally competitive without investment in refurbishment and the development of related branches.

The main **measures** by which aquaculture and fisheries can be developed for smart specialisation of the region are:

- Support for the purchase of equipment to reduce the impact of fishing on ecosystems;
- Support the acquisition of software and monitoring systems for production activity in aquaculture units;
- Facilitating the purchase of equipment and improving the working and safety conditions of aquaculture workers;
- Support for the purchase of modern fish and by-product processing equipment, but also to improve the quality, safety and traceability of products;
- Acquisition of software and monitoring systems for the management of processing units;

Strategic priority 5. Refurbishment in aquaculture and fisheries to support biodiversity and protect the environment

- Development of logistics necessary for storage and specialised transport;
- The increase in the number of first-selling fish centres;
- The promotion and implementation of organic aquaculture;
- Facilitating the creation of national and international partnerships to support innovation in this area;
- Support for training activities for staff employed in organisations working in the field.

Strategic priority 6. Supporting the implementation of innovative solutions in the supply and promotion of tourism services

The South-East Development Region, due to its geographical characteristics, has a high tourist potential, both seaside tourism, spa tourism, mountain tourism or niche tourism, such as wine.

In the region, the number of tourist reception structures increased in 2019 by 36.6 % compared to 2014, amounting to 1504 accommodation units. In 2019, there were 1,898,433 tourists in the region, representing 14.19 % of all registered tourists in Romania. Of these, 93.8 % were Romanians, the remaining 116,003 being foreign tourists. The tourism industry generates a significant number of jobs in the region and investment in this area has a relatively short depreciation duration. The local economy as a whole benefits from the development of tourism. Tourists create additional demand for services and consumer goods, thus stimulating the tertiary sector of the economy (services, trade, craft industries, etc.).At the same time, tourist towns tend to have a more developed building infrastructure and services.

Although the quality of tourism services is the main aspect leading to the development of this branch of activity, it is also the way of promoting services and facilities. Efforts can be focused on both traditional tourism and the promotion of competitive niches and brands, inter alia targeting tourism for the elderly ('third age economy') or environmental tourism, wine tourism, cultural tourism, improving value chains in the tourism sector by targeting more advanced market segments and diversifying tourism activities to reduce dependence on seasonal tourism.

Thus, for the development of regional tourism through innovative solutions, a number of **measures** have been proposed:

- Supporting regional tourism entrepreneurs in purchasing software tools and hardware necessary to manage and promote tourism services;

Strategic priority 6. Supporting the implementation of innovative solutions in the supply and promotion of tourism services

- Encouraging tourism clusters in the region to develop and promote a regional tourism brand; development of e-tourism;
- Facilitating investments conducive to cruise tourism;
- Development and promotion of tourism products with increased added value (eco, oenological, gastronomic tourism, spa tourism, conferences and congresses, cultural, archaeological, fishing tourism, etc.);
- Promoting thematic tourism, such as beekeeping tourism in the Caraorman area, horse tourism in Letea Forest, gastronomic tourism in the Danube Delta;
- Promoting ecological tourism in protected areas such as Letea, Matita-Merhei, Fortuna;
- Local use of traditions, workshops of craftsmen, promotion of less known areas and specific activities;
- Development of programs for the valorisation and preservation of villages with a particular natural, architectural, monumental or agrarian-ecological character;
- Support in identifying funding sources for rehabilitation and modernisation of the cliffs located on the Danube bank: Brăila, Galați, Tulcea, Mahmudia, Sulina for recreational, cruise and yachting access;
- The development of new innovative tourist routes (between the most well-known innovative routes that have been developed in the South-East Development Region, can be mentioned: The road of vineyards by bicycle (Vrancea), Canotca via Delta: innovative methods of interpretation of nature (Tulcea);
- Workshops to inform local entrepreneurs about the opportunity of accessing funding sources to promote innovation in tourism;
- Implementing innovative technical solutions to simplify tourism activities on the one hand, and on the other hand to increase the security of the tourist (chartography of tourist routes with the help of GPS);
- The online promotion of fishing tourism, including through the promotion of fishing gear workshops, boat construction and the exploitation of new resources specific to the fisheries area;
- Facilitating the provision of networks of spaces to promote and capitalise on local identity (fishery museum, information point, exhibition center, specialised guide, etc.).
- Supporting the implementation of innovative solutions for improving tourism services such as: Online booking/paying friendly interfaces, price comparison modules, *on the move* mobile booking apps, *social travel planning* modules.

Strategic priority 6. Supporting the implementation of innovative solutions in the supply and promotion of tourism services

- Supporting the development of all inclusive services in the region.

Strategic priority 7. Support the adoption of SMART CITY solutions at the regional level

According to the United Nations, 68% of the global population will live in the cities by 2050. While cities hold most of the world's wealth, they also produce 70% of CO_2 emissions and consume two-thirds of the world's energy. Therefore, the whole world is preoccupied with the concept of the city "SMART" which can solve some of these challenges.

A SMART city is a city that uses modern technology to streamline traffic, improve public transport, reduce pollution and energy consumption, the relationship of citizens with authority, living conditions and the health and education system. SMART cities increase the living standards of their inhabitants, attract tourists, reduce pollution and bureaucracy. In addition to increasing well-being in general, SMART cities mean more educated, healthier, less expensive, more involved in the whole process of public administration, more opportunities for business and citizens, benefits that translate into improved quality of life - an easier and friendlier interaction of people with the city, the environment, with their peers and oriented towards a future supported by integrated smart technologies. The concept goes beyond the relationship between citizens and public service providers and offers tools that encourage citizens to be more active and participatory in the community life.

Whether using connected rooms to help emergency responders or enabling users to communicate with the city via WiFi and online platforms, smart cities increase the comfort, safety and livelihoods of the people living in them.

In Romania there is a dedicated platform, Smart City Romania, the only networking platform that brings together all the actors in the Smart City Romania Industry, giving them access to a full range of information and services. Smart City Romania is the catalyst of this industry being a tool to create and strengthen the government-company-university-civil society relationship.

In the South-East Development Region there is a branch of the Romanian Association for Smart City, in Constanța. This city is in the process of implementing SMART CITY solutions, such as smart parking solutions and street lighting based on LED technology, poles equipped with multiple components, including sockets for charging electric vehicles and sensors for monitoring environment, but also free wi-fi internet.

Strategic priority 7. Support the adoption of SMART CITY solutions at the regional level

In fact, the existence of a software park in Galați creates the premises for the development of partnerships in order to identify, develop and implement the best SMART solutions in the region.

At the regional level, the support for entities involved in the development and implementation of SMART CITY solutions must materialize through a number of **measures:**

- Supporting the investments for the procurement of hardware equipment and software tools necessary to carry out RDI activities in the field of SMART CITY solutions;
- Supporting the organization of workshop activities to facilitate the exchange of experience and good practices in the field of SMART CITY solutions;
- Support for staff training activities in order to develop the necessary skills in the process of adopting SMART CITY solutions;
- Facilitating partnerships with national or international entities working in the field of developing and implementing SMART CITY solutions;
- Supporting IT clusters for the development and implementation of SMART CITY solutions at the regional level;
- Supporting the implementation of trans-regional or trans-national cooperation projects with other functional partnership structures for the implementation of SMART CITY solutions.

Cross-cutting priority 1. Supporting the work of organizations carrying out research - development and innovation activities

Research, Development and Innovation activity in the region can only increase if access to funding for organizations with RDI activity is supported, and in particular access for private enterprises. Although there have been numerous funding programs for SMEs, startups or scaleups in recent years, these organizations still face difficulties in obtaining funding when it comes to RDI due to the risk they present, their low reimbursemnet capacity in the context of the worsening of the economic and financial situation, the reluctance of financial institutions, the limited guarantees they can offer.

The South-East Region is the region with the lowest RDI expenditures in Romania, although the region is well represented in terms of the number of universities. There are also 5 research and development institutes in the region, which can attract funding for the proposed RDI activities.

Also, at the regional level, there are 9 clusters, a business incubator in Constanța, two industrial parks and a software park that can be supported to attract funds for RDI activities. Supporting the work of innovative clusters and other economic cooperation structures must be based on a diversified, modern infrastructure equipped with European standards at both regional and local level. It is necessary to expand and support the activity of innovative clusters and other cooperation structures and networks as well as economic promotion activities in the South-East Region. It is also appropriate to promote as effectively as possible the innovation clusters and other cooperation structures and networks as catalysts in the economic development and smart specialization in the region.

All these organizations can be supported to carry out research - development and innovation in various forms, some examples of specific **measures** being presented below:

- Supporting investments for the procurement of machinery, hardware and software tools necessary for innovation and/or research/development;

- Supporting the acquisition of patents by small and medium enterprises in the South-East Region;

- Promoting the activity of innovative clusters to expand the partnership network with new members;

- Supporting the use of specific management tools to increase the involvement of members in order to implement actions specific to technology transfer and know-how;

- Supporting the increase of the competencies of the staff involved in RDI activities through professional training activities;

- Supporting clusters for the development of new services and facilities for active members;

- Informing the business environment about national and international funding sources for the implementation of innovative ideas;

- Financing RDI activities for organizations operating in the region;

- Supporting technology transfer in enterprises;

- Promoting the advantages and fiscal facilities for the enterprises that carry out activities within the scope of RDI;

Cross-cutting priority 1. Supporting the work of organizations carrying out research - development and innovation activities

- Facilitating partnerships with entities at national or international level that operate in fields of similar activity in which the RDI element is integrated, in order to ensure an exchange of experience and/or specialized personnel;

- Development of innovation consulting services in the form of integrated service packages (consulting services, assistance and training in terms of knowledge transfer, acquisition, protection and capitalization of intangible assets, use of standards and regulations);

- Development of cooperation between clusters, science and technology parks, incubators, design centers, etc. to promote entrepreneurship in emerging industries.

Cross-cutting priority 2. Digital transformation by supporting the implementation of information and communication technology (ICT) at the level of smart specialization areas

The IT industry is well positioned among the economic fields in our country. The great advantage of the Romanian IT industry consists in the famous quality and creativity of the young specialists. Most of the big players like Intel, Amazon, Adobe, HP, IBM, Nokia, Microsoft, Oracle, Siemens, Motorola, Alcatel, Solectron, or Infineon have already understood this situation and have developed profitable activities to benefit from the opportunities offered by the Romanian market. In the software sector, the development is remarkable, the number of specialists being constantly growing. At the level of the South-East Development Region there are numerous university centers that train ICT specialists, but also the software park in Galaţi and various other organizations that can offer jobs. This highly specialized ICT workforce can contribute to the economic development of the region and the implementation of ICT in all the identified areas of smart specialization.

The main **measures** through which the implementation of information and communication technology (ICT) at the level of smart specialization areas can be supported are:

- Supporting the investments for the procurement of hardware equipment and software tools needed for computerization and technology transfer;

- Facilitating the participation of research and development and innovation entities in the region that carry out activities in the field of ICT in various national and international partnerships;

Cross-cutting priority 2. Digital transformation by supporting the implementation of information and communication technology (ICT) at the level of smart specialization areas

- Supporting the professional training activities of the staff involved in RDI activities that have as final objective the computerization;

- Promoting funding sources for entities that carry out RDI activities in the field of ICT;

- Financing ICT implementation activities at the level of smart specialization areas;

- Facilitating private and public-private partnerships for the implementation of ICT at the level of smart specialization fields;

- Supporting the regional Digital Innovation Hubs for the dissemination of digital capabilities in the regional economy.

Cross-cutting priority 3. Development of human capital involved in research - development and innovation activities

The human resource is the only resource that has the ability to innovate. The South-East Development Region will not be able to close the gaps related to the economic development compared to other regions if it does not invest strongly and constantly to increase people's skills. The number of researchers and staff involved in research activities must be increased through coherent regional and national policies, through attraction, motivation and retention plans.

In order to develop the human capital involved in RDI activities at the level of smart specialization areas, a series of **measures** are recommended:

- Sprijinirea dezvoltării de programe de formare inovative destinate personalului implicat în activități CDI;
- Susținerea tinerilor cercetători prin organizarea de concursuri cu premii pentru activități CDI;
- Organizarea de cursuri de specializare cu experți români și străini, în vederea îmbunătățirii competențelor cercetătorilor și personalului asimilat din regiune;
- Sprijinirea realizării de schimburi temporare de personal între entitățile de cercetare din mediul public și cel privat;
- Suport acordat pentru cooptarea de specialiști/cercetători cu recunoaștere internațională în vederea coordonării echipelor de cercetare;

Cross-cutting priority 3. Development of human capital involved in research - development and innovation activities

- Sprijin pentru implementarea unui sistem integrat la nivel regional de premiere și recunoaștere a rezultatelor notabile din activitatea de CDI obținute de cercetătorii și personalul asimilat;
- Stimularea interesului elevilor și studenților pentru sectorul CDI prin vizite de studiu, stagii de practică și prin implicarea lor în activități și proiecte de cercetare, în cadrul entităților ce derulează activități în domeniu;
- Încurajarea atragerii cercetătorilor cu competențe avansate din străinătate pentru conducerea de proiecte într-o instituție gazdă din Regiunea Sud-Est;
- Facilitarea accesului doctoranzilor și a tinerilor doctori în proiecte de CDI derulate atât în mediul public, cât și în mediul privat.
- Supporting the development of innovative training programs for staff involved in RDI activities;
- Supporting young researchers by organizing competitions with prizes for RDI activities;
- Organizing specialization courses with Romanian and foreign experts, in order to improve the skills of researchers and similar staff in the region;
- Supporting the temporary exchange of staff between research entities in the public and private environment;
- Support provided for the co-optation of specialists / researchers with international recognition in order to coordinate research teams;
- Support for the implementation of an integrated system at regional level for awarding and recognizing the notable results from the RDI activity obtained by researchers and assimilated staff;
- Stimulating the interest of pupils and students for the RDI sector through study visits, internships and through their involvement in activities and research projects, within the entities that carry out activities in the field;
- Encouraging the attraction of researchers with advanced skills from abroad for project management in a host institution in the South-East Region;
- Facilitating the access of doctoral students and young doctors in RDI projects carried out both in the public and in the private environment.

Cross-cutting priority 4. Supporting the application of Key Enabling Technologies (KET) at the level of smart specialization areas

The European Commission defines essential generic technologies or Key Enabling Technologies - KET as technologies related to micro/nano-electronics, photonics, nanotechnology, industrial biotechnology, advanced materials and advanced manufacturing technologies. Being trends in the developed economies of the world, KETs are permanently associated with a very intensive research-development and innovation process, with fast innovation cycles, high capital expenditures and highly skilled labor[47].

KETs can bring innovation to the regional level and support economic development because they can be applied in many industries. These technologies are a sure source of innovation; they allow for a wide range of applications at the level of the products, including those required for the development of energy technologies that enable low carbon emissions, improve the energy efficiency and the resource use, intensifiy the fight against climate change or promote healthy aging.

In 2018, the Association for Generic and Industrial Technologies (ASTEGI) was established in Romania, destined to promote high technology. The ASTEGI Association aims to collaborate in defining a field of perspective technologies, in assessing existing skills in the country and areas of application of interest, thus contributing to the development of a national strategy. The role of the association is mainly related to the connection with industry and the acceleration of the innovation process.

At regional level, the support offered to RDI entities for the development and application of key generic technologies may consist of a number of specific **measures**, such as:

- Supporting investments for the procurement of machinery, hardware and software tools necessary for KET research - development and innovation;

- Facilitating the participation of RDI entities in the region in national and European initiatives in the field of KET;

- Support for training activities for the staff involved in RDI activities in order to develop the skills needed to apply essential generic technologies;

- Informing the entities carrying out RDI activities regarding the national and international funding sources usable for the development and implementation of KET;

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[47] Guide to Research and Innovation Strategies for Smart Specialisation (RIS3), 2012

Cross-cutting priority 4. Supporting the application of Key Enabling Technologies (KET) at the level of smart specialization areas
• Supporting the entities that develop and implement KET;   • Promoting tax advantages and facilities for enterprises carrying out KET activities.

Chapter V. Defining the policy mix and the action plan.

The realization of the policy mix and the action plan for the Smart Specialization Strategy of the South-East Region aims to facilitate a series of concrete actions, as well as it has the role to move from the rhetoric of statistical data analysis to credible steps, visible to all actors involved, which facilitates the strategy implementation process. There have been defined concrete actions for each priority related to the areas of smart specialization, as well as actions for all areas of competitiveness, corresponding to the transversal strategic priorities. The impact of these policies aimed at boosting the innovation process depends very much on how it is implemented but also on the tools used. A low level of innovation performance may be the result of the discrepancies between the proposed action and the tools that can be used. Therefore, choosing an optimal mix of policies and actions is crucial for the development of the innovation in the South-East Region.

The mechanisms used in the implementation of the smart specialization strategy must cover the whole innovative value chain, take into account all stakeholders and use the right tools to mobilize all potential beneficiaries and available public and private resources. Thus, an innovation ecosystem can be created and can be capable of transforming new ideas into innovative products and services, for the benefit of the society as a whole.

The tools proposed for the implementation of S3 cover all 4 formulated strategic objectives. These are both traditional and emerging tools:

- Development of new research infrastructures and the improvement of the existing ones;
- Support for the innovation and technology transfer entities (EITT);
- Support given to the development of the competence centers.
- Grants for RDI activities;
- Supporting the development of research networks;
- Public-private partnerships for innovation;
- Supporting business environment investments in RDI activities;
- Support provided to SMEs, start-ups, spin-offs in innovation;
- Support for social innovation;
- Supporting the establishment / development of science parks, clusters, business incubators and business accelerators;
- Awards for innovation;
- Information sessions / workshops on national and / or European funding opportunities;
- Innovation vouchers;

- Innovation workshops;
- Entrepreneurial Discovery Meetings (EDP);
- Support provided to Digital Innovation Centers (DIC).

5.1. Action plan, delivery mechanisms and pilot projects

The action plan includes medium and long-term public policies and actions available at regional and local level to support the public and private sector in order to invest in the region's key priorities, to facilitate the transition to a knowledge-based society and digital transformation. Its role is to establish concrete actions and modalities to support the achievement of the specific objectives established in this strategy.

The action plan also includes a **list of pilot projects** relevant to each area of smart specialization (Annex 1), which have a significant R&D and innovation component. These projects put into practice the priorities and related measures in the form of innovative ideas that are applicable and achievable at regional level.

The pilot projects, submitted by the key actors in the region working in the field of research, development and innovation, can contribute to the effective implementation of the smart specialization strategy and they were selected according to the two criteria recommended in the RIS3 Guide: relevance for priority areas of specialization and the expected short and medium-term impact. The role of these projects is to provide relevant and concrete information on the innovation potential of the region (they were identified and discussed at the entrepreneurial discovery meetings) and to emphasize that the strategy has concrete means of implementation. Smart specialization pilot project proposals are directly linked to the strategic priorities for smart specialization established at regional level. The proposed project portfolio emphasizes the role of key actors in the region in the process of entrepreneurial development and is a tool through which the strategy can be effectively implemented and directed towards achieving the proposed objectives and results. In addition to this role, the South East Region Action Plan aims to identify potential sources of funding, eligible beneficiaries and target groups for them.

The proposed action plan, related to the strategy, reveals the efforts made by the key actors, through the active involvement of the stakeholders, defined as a quadruple helix: business environment, academia, public institutions and civil society.

The action plan, detailed in Annex 3, has as a starting point the 4 specific objectives of the strategy, defined at the level of Chapter 4:

SO. 1 - Strengthening research and innovation capacities at the level of the academic environment, of the public and private environment;

SO. 2 - Increasing the competitiveness of areas with potential for smart specialization, by digitizing processes and using information systems;

SO. 3 - Development of human resources skills for smart specialization, industrial transition and entrepreneurship;

SO. 4 - Adoption of advanced technologies (KET) in the fields of smart specialization.

The action plan aims to meet these specific objectives, reiterates the 7 strategic priorities on areas of smart specialization and the 4 cross-cutting priorities and comes with a series of concrete actions for the identified measures (Annex 3).

5.2. Target groups, actors involved and related responsibilities

The target groups to which the priorities, measures and actions proposed under this strategy are directly addressed are:

- Private organizations with activity at regional level: large companies, small and medium enterprises (SMEs), start-ups, spin-offs;
- Entrepreneurs;
- Non-governmental organizations;
- Local public authorities;
- Clusters, business networks, business incubators, industrial parks, software parks established at regional level;
- Research institutes, research stations, universities and other accredited RDI and technology transfer entities, with activity at regional level;
- Teachers from the regional education system;
- Staff involved in research - development and innovation activities at regional level;
- Employees from the South-East Region;
- Pupils, students, masters and doctoral students in the regional education system.

The coordination of the governance process and the implementation of the Smart Specialization Strategy of the South-East Region is achieved through the consultative structure of the Regional Innovation Consortium of the South-East Region (RIC South-East). This structure without legal

personality is coordinated by the South-East RDA and consists of representatives of academia, research, innovative enterprises, public authorities and civil society. RCI South-Est has 41 members and has the mission to contribute to the development of a regional knowledge-based economy by facilitating the capitalization of regional synergies in the field of Research - Development - Innovation and by strengthening the link between Research - Development - Innovation and entrepreneurship.

The Regional Innovation Consortium consists of representatives of the following categories of institutions / entities / organizations:

- Research/education;
- Entrepreneurship;
- Public authorities;
- Civil society/Users.

The Regional Innovation Consortium of the South-East Region has the following attributions, in accordance with the provisions of the Methodology for the elaboration of the Framework Document for the Regional Research and Innovation Strategy for Smart Specialization:

- participates and provides views, proposals and comments in the consultation process on the development and updating of RIS3 South-East;
- analyzes the portfolio of priority projects of RIS3 South-East;
- monitors the RIS3 South-East strategy;
- contributes to the identification of the necessary information sources for the monitoring of RIS3 South-East;
- provides information on projects implemented in the South-East Region in accordance with RIS3 priorities;
- proposes possible structural and legislative changes necessary for the implementation of RIS3 South-East;
- inform the management of the institution he/she represents about the tasks and activities carried out within the RIC and ensure that his/her position in relation to the decisions, documents debated or elaborated within the RIC is consistent with the official point of view of the institution/organization it represents within the CRI;
- disseminates to other institutions and organizations with which it is in institutional relations the relevant information regarding the activity of the Regional Consortium, the priorities and the measures from RIS3 South-East;
- proposes to supplement this regulation with other tasks and responsibilities.

5.3. Proposed time intervals and indicators

The implementation of the Regional Smart Specialization Strategy of the South-East Region 2021 - 2027 will be achieved for 7 (+2) years, between 2021 and 2029[48]. This interval allows the correlation of the indicators established within the strategy with the program indicators monitored by the South-East RDA within the ROP 2021-2027.

It should also be mentioned that the proposed interval allows the implementation of the measures simultaneously, not being any interdependence between them or a priority order.

The indicators for monitoring the Regional Smart Specialization Strategy of the South-East Region 2021 - 2027 are presented in Chapter VI of this strategy.

5.4. Funding sources

Research, development and innovation activity plays a key role in generating smart and sustainable growth and in creating long-term jobs. By producing new ideas, knowledge, mechanisms, research is essential for the development of new and innovative products, processes and services, which increase productivity, industrial competitiveness and, ultimately, the well-being of the population.

One of the European Union's priorities is to boost RDI activities, in particular by allocating substantial funds to these activities. Horizon 2020 (with a budget of over € 80 billion) is currently being continued with the Horizon Europe research and innovation framework program, an initiative to support research and innovation from concept to commercialization, and complements national and regional level. The program is based on the premise that Europe's future growth and future prosperity depend on its ability to remain a world leader in research and innovation. Horizon Europe provides the means to achieve this goal. Thus, Horizon Europe should strengthen both the EU's science and technology sectors to address key global challenges in vital areas such as health, aging, security, pollution and climate change.

The implementation of the Regional Smart Specialization Strategy of the South-East Region 2021 - 2027 will be financed through several funds, both European (especially the European Regional Development Fund) and national.

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[48] For the 2021-2027 programming period, the European Commission has proposed changing the rules on decommitment. If in the period 2014-2020, decommitment was on the "N + 3" rule, for the period 2021-2027, at the level of the proposed regulation on the Structural Funds, it is foreseen to return to the "N + 2" rule (COM (2018) 375 final)

In Romania, the funds for the research-development activity come from several programs, which are managed by the Ministry of Education and Research and the Ministry of European Funds.

In this chapter, the main sources of funding for research, development and innovation in Romania are briefly presented, while more information and details on these programs and funding schemes can be found on the websites dedicated to the funding programs. The funding programs addressed in this strategy are:

- Horizon Europe
- South-East Regional Operational Program 2021 - 2027
- Technical Assistance Operational Program 2021-2027
- Education and Employment Operational Program 2021-2027
- Just Transition Operational Program 2021-2027
- InvestEU Program 2021-2027
- Smart Growth, Digitization and Financial Instruments Operational Program (POCIDIF)
- Digital Europe Program for the period 2021-2027

Horizon Europe Program 2021-2027

Horizon Europe Program 2021-2027 is the most ambitious funding program for research and innovation, building on the achievements and success of the current Horizon 2020 research and innovation program. It will continue to drive scientific excellence through the European Research Council (ERC) and the Marie Skłodowska-Curie Fellowships and Exchanges and will benefit from scientific advice, technical assistance and specific research activities of the Joint Research Center (JRC), the Commission's Scientific and Knowledge Service[49].

The program will introduce new elements, stimulating the scientific, economic and societal impact of EU funding, through interventions aimed at:

- Strengthening EU science and technology, thanks to increased investment in highly qualified and state-of-the-art research;
- Encouraging the EU's industrial competitiveness and innovative performance, in particular by supporting the creation of innovation markets through the European Innovation Council and the European Institute of Innovation and Technology;
- Respecting the EU's strategic priorities, such as the Paris Agreement on Climate Change and addressing global challenges to the quality of daily life.

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[49] European Commision (2020), EU funding for research and innovation 2021-2027, available at
https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-research-innovation_en.pdf

The program will be implemented through three pillars:

Pillar 1. Open science builds on the success of the European Research Council (ERC), the Marie Skłodowska-Curie actions and the "Research Infrastructures" component of the current Horizon 2020 Program.

Pillar 2. Global challenges and industrial competitiveness includes four thematic clusters that address the full range of global challenges through top-down collaborative research and innovation activities: Health, A safe and inclusive society, Digital development and industry, Climate, energy and mobility, and Food and natural resources.

Pillar 3. Open innovation will focus mainly on encouraging revolutionary and market-creating innovation, through a new European Innovation Council (EIC), and on activities aimed at strengthening and developing the overall European innovation landscape, by also supporting the European Institute of Innovation and Technology (EIT).

South-East Regional Operational Program 2021-2027

ROP SE 2021-2027 aims to continue the strategic vision on regional development in Romania, by completing and developing the directions and priorities of the regional development contained in the national/regional strategies and implemented through ROP 2014–2020 and other national programs.

The general objective of the ROP SE 2021-2027 is to increase the economic competitiveness and improve the living conditions of local and regional communities by supporting the development of business environment, infrastructure and services, to ensure the sustainable development of the region, able to manage the resource efficiently, to capitalize on its potential for innovation and assimilation of technological progress. Through the proposed actions, the ROP SE 2021-2027 aims to reduce disparities and transform the Region into a more attractive region, with a stable and diversified economic space, in which research and innovation play an active role.

Within the ROP SE 2021-2027, the research, development and innovation activity is supported by **Priority Axis 1. A competitive region through innovation, digitalisation and dynamic enterprises** and **Priority Axis 2. A region with SMART cities**, presented below.

Priority Axis 1. A competitive region through innovation, digitalisation and dynamic enterprises

Specific objectives:
- (i) Development of research and innovation capacities and adoption of advanced technologies;
- (ii) Leveraging the benefits of digitalisation for the benefit of citizens, companies and governments;

- (iii) Boosting the growth and competitiveness of SMEs;
- (iv) Development of competencies for smart specialization, industrial transition and entrepreneurship

Supported actions:

1.1 Supporting innovation activities

1.2 Regional smart specialization

1.3 Supporting technology transfer to increase the level of innovation for the enterprises

1.4 Increasing the degree of digitization

1.5 Supporting innovative companies and increasing their survival rate through business support infrastructures

1.6 Stimulating innovative activities and increasing the competitiveness of SMEs

PA 1 allocation: approximately 250 million euros ERDF

Priority Axis 2. A region with SMART cities

Specific objectives:

- (ii) Capitalizing on the advantages of digitalisation, for the benefit of citizens, companies and governments

Among the actions supported in order to capitalize on the benefits of digitalization, there are: solutions dedicated to promoting the business environment and local opportunities, attracting investment, developing live labs for smart city solutions, traffic management solutions (smart traffic lights, monitoring centers and traffic management, smart pedestrian crossings), parking management (applications, sensors, online payments), public transport management (modernization of waiting stations, display of waiting times, applications for finding optimal routes including cycling and walking or optimal routes for people with disabilities, online or telephone payments, public transport management system), smart buildings, measuring and streamlining utility consumption and simplifying payments, tourism and promotion (City pass tourist, digitization or digital reconstruction of tourist attractions, applications for promoting the tourist attractions, virtual tours for museums and tourist attractions, including public spaces of tourist interest, virtual libraries, online or phone payments), public space (public WI-FI, monitoring and security of public space, living labs), smart street furniture, optimization of the urban environment, development of smart city solutions (interactive applications, e.g. public incident map), information or education of citizens (open databases, online platforms, applications, panels, etc.), digitization of public services, digitization of the activity of public institutions (eg project management system/ERP, electronic registration, electronic signature , digital archiving, etc.), interoperability of electronic public services provided at local/county/metropolitan/FUA level, including interconnection with national systems),

cybersecurity, Urban / Metropolitan Smart and digital innovation centers, equipping cities with data collection infrastructure, remote management of public lighting, waste management, care of green spaces (eg automation of irrigation systems, smart management of green space systems), improving air quality, reducing noise levels, etc.

PA 2 allocation: approximately 120 million euros ERDF

Technical Assistance Operational Program 2021-2027

The Technical Assistance Operational Program (TAOP) 2021-2027 will ensure the efficient and effective use and management of EU funds, supporting the programming, monitoring, control, audit, evaluation, communication of the priorities set by the European Union. As the new multi-annual financial framework for the period 2021-2027 proposes the modernization of cohesion policy and its change into a simple and flexible policy, it is envisaged to simplify and introduce new flexibility instruments to facilitate the final beneficiaries of the funds. The rules underlying the use of funds will be fewer and clearer, the same management and control system will be used as a whole as for the operational programs from 2014-2020, a single audit principle will be applied, and technical assistance will continue to be used.

Increasing the administrative capacity in the institutions involved in the management of the programs financed from the European funds and at the level of beneficiaries remains a priority for the programming period 2021-2027. The technical assistance provided through the Technical Assistance Operational Program will be used in complementarity with the specific measures to increase the administrative capacity of the beneficiaries, which will be found in the operational programs. TAOP 2021-2027 proposes to continue the approach from 2014-2020, respectively the financing from TAOP of horizontal measures and technical assistance for operational programs managed by MEF that will not have their own technical assistance axis, respectively PODD, POCID, POS, POCS, POTE and POAT. The TAOP will also ensure effective information to potential beneficiaries on funding opportunities from European funds, as well as will ensure the transparency of the implementation of the funds.

The program is structured on 3 investment priorities, such as:

Priority 1 Ensuring the functioning of the coordination and control system of ERDF, CF, ESF+ and OP management (financed by ESF +)

TAOP 2021-2027 is a program for the entire system of coordination and control of ERDF, ESF + and CF funds as well as the system for managing operational programs run by MEF.

Priority 1 aims to ensure a highly qualified, capable and duly motivated staff by financing the related salary expenses, as well as by creating the appropriate logistical framework to allow the coordination

and control of ERDF, ESF +, CF funds, as well as the management of operational programs carried out by MEFs that do not have a priority axis of technical assistance.

Budget Priority 1: 362,666,667 million euros (217,600,000 ESF+ + 145,066,667 CN)

Priority 2 Ensuring the transparency of ERDF, CF, ESF+ funds (financed by the ERDF)

Priority 2 aims at the widest possible dissemination of information on the ERDF, ESF+, CF funds allocated to Romania and how they are used through operational programs.

There are mainly 3 strategic goals: informing the categories of public, motivating the relevant public and resolving issues related to the use of funds, for the following topics/types of content:

- Communication about funds in general (for the purpose of informing and motivating the target audience)
- Communication about the calls for projects/opportunities offered (in order to inform and motivate the target audience, plus solving some issues related to the use of funds)
- Benefits of the funds and how the projects are implemented (for the purpose of informing, motivating the target audience, as well as solving some issues related to the use of funds and the implementation of projects)
- Evaluation of the communication (for the purpose of informing, motivating the informed public, as well as solving some issues related to the use of funds and the realization of the communication)
- Technical assistance and internal communication, which play an important role in the efficient functioning of the information system (in order to resolve issues related to the use of funds and the implementation of communication).

Budget Priority 2: 45,000,000 million euros (27,000,000 ERDF + 18,000,000 CN)

Priority 3 Improving the capacity to manage and implement ERDF, CF, ESF + funds (financed by the ERDF)

In what concerns the strengthening of the coordination and control capacity of the European funds and the management of the OP:

- Support the coordination of the implementation of OP with ESF funding, as well as the monitoring of ITI implementation.
- Support will be provided for the development of analyzes, studies, strategies, methodological documents, surveys related to the system coordination and monitoring process at horizontal

level, as well as for additional consultancy and expertise in carrying out system coordination and OP monitoring activities.

- The TAOP will support measures aimed at strengthening the capacity of the funding system, organizing meetings/events/conferences/working groups/specific networks/committees/ exchanges of experience, etc. related to or with impact on the management, monitoring and implementation of OPs / ERDF, ESF + and CF funds, including the organization and functioning of the MC for POAT, POS, POIDS, PODD and POCIDIF, as well as the measures to ensure the participation of those involved in them.
- Horizontal support for the system and beneficiaries will contribute to strengthening their capacity and will be complementary to the support for project implementation provided through the OP.
- Potential beneficiaries and beneficiaries will be supported through the help-desk structures of MEF/MA/IB.
- Assistance will be provided to support the structures for strategic projects (research/ digitization), in terms of providing guidelines, directions and good practices, etc.
- Technical assistance will be funded for the development of financial instruments and support to the MA/IB in the implementation of their related operations in the OP, etc.

In what concerns the specific training for the system and beneficiary:

- Support will be provided for horizontal and specific training for the ERDF, CF, ESF+, JTF fund management system and for beneficiaries.
- The professional training of the staff within the structures of the coordination, management and control system, as well as of the beneficiaries will be supported, according to the specifics of the position and the priority needs identified at the structure level, in order to streamline specific activities, trainings roundtables, seminars, workshops).

In what concerns the project preparation, TAOP will provide support for project identification and development and the preparation of technical and economic documentation for projects.

Budget Priority 3: 190,833,334 million euros (114,500,000 ERDF + 76,333,334 CN)

Eligible beneficiaries: Minister of European Funds (MA TAOP, MA/IB Health, MA/IB Combating Poverty, MA/IB Sustainable Development, MA Smart Growth and Digitization, DG PCS, DG PCS-Evaluation Office, SMIS IT Directorate, European and International Cooperation Directorate), ADI ITI DD, ADI ITI Valea Jiului, Audit Authority, Certification and Payment Authority, MA OP Transport, MA POCU, 8 MA POR, MA CBC, Beneficiaries of funds.

Education and Employment Operational Program 2021-2027

In the context of policy objective 4 - "A more social Europe", the general objective of the Operational Program Education and Employment 2021-2027 is to contribute to the creation of a more social Romania with equal access to sustainable employment, quality, a relevant education system for the labor market and a stimulus for lifelong learning.

The specific objectives of the EEOP are represented by:

Education

- improving accessibility, quality and affordability, in terms of costs, education and care of preschool children, including related infrastructure;
- prevention of early school leaving, by introducing a student-centered approach, for children at risk, flexible "Second Chance" programs, but also relevant counseling and career guidance services, while improving teachers' skills, so that they can pay the necessary attention to children from vulnerable / disadvantaged groups;
- improving the quality of vocational education and training, so as to adapt to developments in the labor market, including the necessary training and the provision of specific equipment;
- supporting the development of innovative and effective teaching methods and techniques.

Employment

- integration of young people on the labor market;
- ensuring access to employment for vulnerable groups, including increasing women's employment;
- developing the entrepreneurial culture, supporting entrepreneurship and the social economy;
- development of mechanisms for anticipating skills and monitoring active employment policies;
- developing the social dialogue and involving the social partners in the implementation of employment policies, also by increasing their capacity;
- ensuring a safe and healthy work environment and promoting active aging;
- increase participation in lifelong learning to ensure labor market transitions and employee mobility.

EEOP 2021-2027 is structured on 9 investment priorities, as follows[50]:

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[50] Ministry of European Funds (2020), Education and Employment Operational Program, October 2020 version, available at http://mfe.gov.ro/wp-content/uploads/2020/07/e96733c0a68d30a9c92a78e29d169caa-1.pdf

1. Capitalizing on the potential of young people on the labor market;

Youth employment is a major goal for labor market policies. The priority dedicated to young people aims to highlight the economic potential that this target group has. The measures proposed in the EEOP aim at developing networks of youth workers and youth centers/clubs, as well as ensuring integrated packages of active measures tailored to the needs of young people, including to stimulate private initiative and entrepreneurship among them. The NEET youth category will continue to benefit from support through new tools for their identification and activation and access to integrated packages of active employment and skills training measures, including integration into flexible work or volunteer programs.

2. Preventing early school leaving and increasing access to and participation of disadvantaged groups in education and training

Increasing participation in education from an early age and preventing early school leaving, especially for disadvantaged groups, are major challenges that will be addressed through measures both at the level of the education system and through measures focused on primary and family beneficiaries: support for training (initial and continuous) for the education staff, in particular for early education and adaptation of teaching methods to the needs of students from disadvantaged categories and backgrounds, modern programs, adequate resources and facilities at the level of schools, establishment/extension of complementary services for children, information programs, counseling and parental education, extension of after-school and remedial education programs, counseling, recreational activities, support services/accompanying measures to prevent early school leaving.

3. Increasing the quality of education and training to ensure the fairness of the system and better adaptation to the labor market dynamics and the challenges of innovation and technological progress.

EEOP interventions will support the increase of the quality of the offer and the educational act, with direct effect on the increase of the graduation rate at the national evaluation or at the baccalaureate exam, as well as on the increase of the participation rate in tertiary education or international learning mobility.

4. Increasing the accessibility, attractiveness and quality of vocational and technical education

The relationship with the dynamics of the labor market is a priority for vocational and technical education to ensure in real time the labor needed for the economic environment. In this sense, the measures aim at encouraging partnerships with economic operators, ensuring the quality of students' practical training programs, ensuring the standards of endowment of "school workshops", with

teaching aids and equipment both at the level of vocational education units and at the level of economic operators, in line with the skills needs required by the labor market.

5. Increasing access to the labor market for all

In the context of situations caused by systemic shocks (eg COVID - 19 pandemic), funding is provided for specific support measures for job retention in the affected economic activities / sectors (eg support for the technically unemployed; payment of a salary share, in order to maintain jobs; reduced work programs of "Kurzarbeit" type, etc.)

6. Entrepreneurship and social economy

EEOP targets entrepreneurial support programs through actions of promotion or entrepreneurial training (entrepreneurship week, training of entrepreneurial skills, tutoring / mentoring, etc.), but also by providing financial support for starting new businesses (start-up schemes such as Diaspora, Rural, Restart). Special attention will be paid to actions to promote the concept of social economy. At the same time, grants are proposed for the establishment of social enterprises and social insertion enterprises, as well as assistance and consultancy programs in post-establishment business, also through training programs for managers or measures to improve SMEs' access to various ways of digitization of the activity.

7. Supporting labor market reforms in line with labor market dynamics

Labor market reforms follow the dynamics of the labor market and take into account both activities aimed at updating the mechanisms for anticipating skills needs and monitoring and developing active employment policies, as well as actions to strengthen the social dialogue and strengthen partnerships for employment and professional training (increasing the capacity of Sectoral Committees, integrated packages for the social partners in order to modernize and improve the functioning of social dialogue for the labor market).

8. Strengthening population participation in lifelong learning process to facilitate transitions and labor market mobility

Last but not least, strengthening the participation of the population in the lifelong learning process will be approached transversally, both at the level of the education system and through continuous training on the labor market, to ensure a labor supply relevant to changing needs of them market, qualified, adaptable and able to cope with professional transitions and labor market mobility. The measures aim at:

- Expanding and diversifying opportunities / offer for participation in lifelong learning process, also by financing participation (establishment / development of lifelong learning centers);

- Facilitating the acquiring of a qualification for the people who left school early;
- Increasing the access and participation of adults in programs for the development / increase of the level of key competencies;
- Training packages for employees adapted to the needs / requirements of the market: "Basic package", "Keep up"; "Digital access for all", collaborative training programs, continuous training of employees in accordance with the needs identified by employers in order to meet the challenges in the field of activity.

Total EEOP udget: 5.775 billion Euro, out of which: 3.861 billion Euro ESF+ 1.913 billion Euro national co-financing.

Eligible beneficiaries:

- Central authorities / institutions and public services with attributions in the field (ex, MMPS, MEN, ANC, ANOFM, CNFPA etc);
- Local authorities / institutions and public services with attributions in the field (decentralized services of MMPS, MEN, ANOFM etc, ATUs);
- Public or private providers of employment services / education or training services / skills assessment and certification services / career information and counseling services;
- Educational units from the national education system;
- Higher education institutions;
- Research institutes;
- Youth associations;
- Chambers of Commerce;
- Non-governmental organizations;
- Employers, social partners, employers 'and trade unions' associations, sectoral committees and relevant actors at the level of economic sectors;
- County Commissions for Authorization of training providers, Regional Training Centers, Competence Assessment Centers;â
- Community or youth centers.

Just Transition Operational Program 2021-2027

The general objective of the program is represented by the need to support the territories most affected by the transition to climate neutrality and to avoid deepening regional disparities.

The JTOP only supports activities that are directly related to its specific objective related to enabling regions and citizens to address the social, economic and environmental impact of the transition to a climate-neutral economy.

The actions to be funded by the JTOP, as set out in the European Environment Pact and the Investment Plan for a Sustainable Europe, complement the other actions in the next multiannual financial framework for the period 2021-2027, but from the unique perspective of contributing to addressing the social and economic consequences of the transition to climate neutrality of the Union through the combined use of climate finance and social objectives at regional level.

Priority 1. A just transition through the development of entrepreneurship, SMEs, research and innovation and digitalisation

Investment categories:

1.1. Investments in the establishment, development and operationalization of business incubators

1.2. Investments in the creation of new businesses, including through consulting services;

1.3. Investments in research and innovation activities that lead to increasing the competitiveness of enterprises;

1.4. Economic development by promoting the transfer of advanced technologies and supporting cooperation between industry and researchers;

1.5. Productive investments in SMEs, including newly established enterprises, leading to economic diversification and reconversion;

1.6. Increasing the competitiveness of enterprises through digitalization and advanced digital skills;

1.7. Increasing the digitization of public services to reduce the administrative burden for the business environment.

Eligible beneficiaries: Enterprises (micro-enterprises, SMEs, consortia of enterprises, large enterprises), partnerships between local/central public authorities/their subordinate structures with any of the mentioned beneficiaries, partnerships of enterprises with RDI organizations, universities, LPAs, research institutes , innovation and technology transfer entities, management entities for business support structures.

Priority 2. A just transition through investment in low-emission clean energy technologies and infrastructure

Investment categories:

2.1. Investing in the development of technologies for green energy

2.2. Investments in the realization of photovoltaic parks connected to the (operational) networks - it can be a solution to finance these parks on the lands belonging to the former mines or factories, thus realizing integrated decontamination/regeneration/reconversion projects.

2.3. Investments in wind turbine construction (wind farms - connected to the network)

2.4. Investments in photovoltaic farms to promote the use of energy from renewable sources at the level of industrial operators

Eligible beneficiaries: enterprises

Priority 3. A just transition by reducing pollution and strengthening the circular economy

Categories of interventions

3.1. Investments in the regeneration and decontamination of polluted sites

3.2. Investments in land restoration and reconversion projects, including through water management measures and the creation of green infrastructure in urban areas

3.3. Investments in waste management schemes at county level in order to strengthen the circular economy

3.4. Actions to prevent the generation of waste and reduce its quantity, as well as actions to increase their efficient reuse and recycling.

Eligible beneficiaries: LPAs and their partnerships, enterprises

Priority 4. A just transition based on increasing employment

Categories of interventions:

4.1. Training of workers Qualification and requalification in various green sectors of the economy

4.2. Financial support for dismissed persons who are close to retirement age (Pension Bridging)

4.3. Job search assistance (including mobility packages).

4.4. Active inclusion of jobseekers (including medical support)

Eligible beneficiaries: Jobseekers, unemployed, long-term unemployed, people from disadvantaged groups in the labor market, inactive people, public authorities and institutions, enterprises, employment and training service providers, AJOFM in collaboration with employers.

Budget: JTOP 2021-2027 - has proposed a total indicative allocation of approx. 1.766 billion Euro FEN, of which 0.766 billion JTF and 1 billion NGEU to which is added a national co-financing of 0.264 billion, being available a total of 2.030 billion euros

InvestEU Programme 2021-2027

The InvestEU program brings together the many EU financial instruments currently available and extends the successful model of the Investment Plan for Europe, the so-called "Juncker Plan". Through

InvestEU, the Commission will continue to stimulate investment, innovation and job creation, mobilizing an estimated 650 billion EUR for additional investment[51].

The program is needed in a context where investment conditions in Europe have improved since the launch of the Juncker Plan in 2014, due to a more favorable economic situation and public interventions, such as the European Fund for Strategic Investments (EFSI), which is the core of the Juncker Plan. However, there is still a considerable investment deficit in Europe.

The InvestEU program supports four different policy areas, focusing on the areas where the EU can bring the most added value by providing a budgetary guarantee to attract private investment[52]:

Sustainable infrastructure - InvestEU funds projects in the following areas: sustainable energy, digital connectivity, transport, circular economy, water, waste and environmental management infrastructures and others.

Research, innovation and digitization - InvestEU funds projects in the following areas: research and innovation, commercialization of research results, digitization of industry, fostering the growth of innovative enterprises, artificial intelligence and others.

Small enterprises – Facilitating the access to finance for small and medium-sized enterprises (SMEs), small companies with medium capitalization.

Social investments and skills - InvestEU funds projects in the following areas: skills development, education, training, social housing, schools, universities, hospitals, social innovation, healthcare, long-term care and accessibility, microfinance, social enterprises, integration of migrants, of refugees and vulnerable persons and others.

Smart Growth, Digitization and Financial Instruments Operational Program (POCIDIF)

The Smart Growth, Digitization and Financial Instruments Operational Program will finance interventions in the fields of research, development and innovation/smart specialization and in the field of digitization at the level of central public administration, financed either by grants or by financial instruments in compliance with State Aid rules, to meet the challenges identified at national level. It aims to create in Romania an ecosystem that enhances the competitiveness of society in the context of

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[51] European Commission (2020), What is the InvestEU Programme?, available at https://ec.europa.eu/commission/sites/beta-political/files/budget-june2018-what-is-investeu_ro.pdf
[52] European Commission (2020), InvestEU: What will it finance?, available at https://ec.europa.eu/commission/sites/beta-political/files/budget-june2018-investeu-finance_ro.pdf

technological change, starting from the development needs identified by the National Strategy and the 8 Regional Smart Specialization Strategies and aims to reach the potential of digital technologies to create new development opportunities, both for the public system as well as for the business environment.

The investment priorities to be financed under POCIDIF are:

1. Integration of the RDI national ecosystem in the European and international Research Area;
2. Creating and promoting an attractive system of innovation in the economy for all types of innovation;
3. Development of the RDI capacity of higher education institutes;
4. Development of the RDI capacity of INCDs / ICARs;
5. Developing the RDI capacity of large enterprises;
6. Development of large RDI infrastructures, including technology transfer;
7. Digitization in education;
8. Digitization in culture;
9. Digitization in the central public administration;
10. Stimulating access to finance for SMEs through the use of Financial Instruments.

Specific objectives:

- SO (i) Development of research and innovation capacities and adoption of advanced technologies
- OS (ii) Improving digital connectivity
- SO (iv) Development of skills for smart specialization, industrial transition and entrepreneurship

Eligible beneficiaries: Higher education institutes, INCDs / ICARs, enterprises, partnerships.

Digital Europe Program for the period 2021-2027

The digital transition is a key component for future prosperity and resilience in Europe. With a proposed budget of around 8.2 billion euro (9.2 billion euro in current prices), the Digital Europe Program aims to build the European Union's strategic digital capabilities and facilitate the large-scale development of key digital technologies, such as artificial intelligence-based applications of last generation and state-of-the-art cyber security tools.

The general objective of the program is to support the digital transformation of the enterprises and to promote a better use of the industrial potential of innovation, research and technological development policies, as well as the modernization of specific sectors of public interest, for the benefit of enterprises,

especially those of SMEs and of citizens across the Union. In addition, the program aims to improve the Union's level of competitiveness and the resilience of its economy.

The Digital Europe Program will provide funding for projects in key areas such as: supercomputing (€ 2.4 billion), artificial intelligence (€ 2.2 billion), cybersecurity (€ 1.8 billion), advanced digital skills (€ 600 million) and ensuring the widespread use of digital technologies at all levels of the economy and society (1.2 billion euros) [53].

Funding for projects designed to strengthen high-performance computing[54] will benefit areas such as health services, environmental protection and security. The support for the spread of the use of artificial intelligence will include, for example, ensuring improved access to artificial intelligence testing infrastructure.

The program will support the organization of training courses in the field of advanced digital skills for the workforce and students, as well as for small and medium-sized enterprises and public administrations. Ensuring funding will make it possible to guarantee simple, reliable and without syncope access to digital public services, for example by extending the interoperability of public services across the EU.

European digital innovation centers[55] will play a central role in implementing the program and stimulating the widespread adoption of advanced digital technologies by the businesses, including SMEs, public bodies and academia. These centers will be a crossroads where, on the one hand, industry, businesses and administrations looking for new technological solutions and, on the other hand, companies that can offer ready-to-market solutions will meet. Spread over a wide geographical area in Europe, the centers will play a key role in implementing the program.

The Digital Europe program has been developed in complementarity with other programs that support digital transformation, such as Horizon Europe, but also with the Mechanism for the Interconnection of Europe.

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[53] European Commission (November 2020), Europe investing in digital: the Digital Europe Programme, available at https://ec.europa.eu/digital-single-market/en/europe-investing-digital-digital-europe-programme

[54] Council of the European Union (March 2019), Digital Europe Program - Copart confirms that a common interpretation has been reached, together with the Parliament, available at: https://www.consilium.europa.eu/ro/press/press-releases/2019/03/13/digital-europe-programme-coreper-confirms-common-understanding-reached-with-parliament/

[55] European Parliament (November 2018), REPORT on the proposal for a regulation of the European Parliament and of the Council establishing the Digital Europe Program for the period 2021-2027 (COM(2018)0434 – C8-0256/2018 – 2018/0227(COD)

Chapter VI. Integration of monitoring and evaluation mechanisms

In order to ensure a successful and efficient implementation of the Regional Smart Specialization Strategy of the South-East Region, it is necessary to consider, in addition to the relevance of the actions planned for the regional development, the capacity to monitor and evaluate the results obtained from the implementation of the proposed actions, so as to ensure the achievement of the objectives proposed by the strategy and to constantly monitor the level of compliance with the established directions of action. Also, where necessary, the monitoring and evaluation of the strategy will allow the adjustment of future actions according to the context of their implementation, so as to achieve the planned objectives and results.

The monitoring process aims to verify that the activities are properly planned and that the funds are correctly used to obtain the indicators of immediate achievement. At the same time, the evaluation process aims to analyze the effects of the actions taken (their contribution to the changes observed and measured by the result indicator). Considering the mentions of the European Commission's guide - RIS3 for the development of smart specialization strategies, the proposed evaluation and monitoring system is based on a series of indicators developed and correlated with the regional specificities.

The activity of monitoring the implementation of the Regional Strategy for Smart Specialization of the South-East Region can be subsumed, from the perspective of financial and human resources involved, to the activity of monitoring the implementation of projects that will be supported through various funding programs, in the context in which the activities and the results of the strategy are at least complementary and respectively correlated in some cases with these funding programs.

In order to monitor the strategy, it is proposed to collect data and information from sources such as: databases of the National Institute of Statistics, administrative data transmitted by local and central public authorities, data collected by consulting the relevant actors - public and private (especially for analysis activity in the field of Research, Development, Innovation).

In this context, a strategy for monitoring and evaluating the strategy is proposed, which aims to define a set of indicators for measuring the level of innovation and the proposed results in the field of research, development and innovation. The proposed mechanism for monitoring the strategy envisages the definition of 3 categories of indicators, such as:

- Context indicators, which will facilitate the analysis of the positioning of the region in a national/ European context;
- Result indicators, which will allow the measurement of the contribution to the global objectives and the verification of the direction of the change in the proposed direction (and the causes);

- Indicators of immediate achievement (output indicators), which will allow measuring the progress of the actions taken.

The proposed horizon for the implementation of the Strategy is 2021-2029[56]. The monitoring will take place every two years from the start of the implementation of the Regional Smart Specialization Strategy, starting with 2023, and the monitoring reports will be prepared by the South-East Regional Development Agency. The monitoring reports will be presented to the members of the Regional Innovation Consortium, in order to analyze the progress registered in the implemented actions and to formulate recommendations for the future implementation of the strategy. The monitoring will also be carried out according to three levels:

1. **Level of the Strategy**: The progress in the implementation of the transversal priorities described at the level of the Smart Specialization Strategy of the South-East Region will be monitored.
2. **Level of the smart specialization areas**: Indicators will be established to measure the degree of fulfillment of the specific objectives proposed in the strategy, at the level of each smart specialization priority. These are detailed in the rest of this chapter.
3. **Level of the strategic priorities**: The effect of implementing the measures set out in each strategic priority will be measured. In order to measure the impact, data will be collected both from the Annual Implementation Reports (AIR) of the National Operational Programs for the period 2021-2027, and from monitoring data and published statistics related to funding programs managed at European Union level (Ex: Horizon Europe 2021-2027).

In what concerns the evaluation process, there will be 2 key milestones, respectively 2025 and 2029, at the level of which it is proposed to develop the following evaluation documents:

1. Interim evaluation of the implementation of the Smart Specialization Strategy of the South-East Region, carried out in 2025, with the following objectives:
   a. Evaluation of the degree of implementation of the proposed measures at the level of strategic priorities. There will be analyzed the launched project calls, the degree of receptivity to the launched project calls, the intermediate results achieved by the supported projects (which have research-development-innovation components);
   b. Evaluation of the the progress of the context indicators, which are detailed in this chapter. The monitoring of the indicators will be performed based on secondary data, by consulting the statistics published by the National Institute of Statistics, Eurostat, etc;
2. Ex-post evaluation of the Smart Specialization Strategy of the South-East Region, which will take place in 2029, with the following objectives:

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[56] Following the 2021-2027 programming period, including the N+2 rule.

a. Evaluation of the results registered by implementing the measures proposed for achieving the strategic priorities, at the moment when all the contracted projects will be completed;

b. Evaluation of the degree of fulfillment of the target values set at the level of the strategy, as well as the regional impact of the measures taken.

The evaluation will start from the data collected and interpreted at the level of the monitoring reports, which will be corroborated with additional primary and secondary data collected in order to evaluate the results achieved at the level of the region.

6.1. Context indicators

Considering that the Regional Smart Specialization Strategy of the South-East Region does not have a defined and independent financial plan (and it is only correlated with the Operational Programs 2021-2027), the indicators proposed for monitoring and evaluating the strategy will not have numerical values allocated, being chosen a measurement of the indicators in terms of evolution in the proposed period. Thus, the following calculation methodology was used: for the period 2014-2019, the annual average value of each proposed context indicator was calculated, and in the situation where for 2019 there were no data available, the most recent year at which the data were available was used, the resulting value being used as a benchmark for assessing the trend of the indicator. Using this methodology, we identify five distinct evolutionary options:

Symbol for evaluating the trend of the indicator	Significance
+ +	Strongly positive evolution of the indicator This score is given if, at the level of the analyzed indicator, a significant increase[57] is observed compared to the average value in the reference period (2014/2019).
+	Positive evolution of the indicator This score is given if, at the level of the analyzed indicator, an increase is observed compared to the average of the value in the reference period (in the average growth parameters of the reference period).
=	Uncertain evolution of the indicator

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[57] A significant value is considered if the indicator will be above the highest growth rate recorded in the reference period (eg for the indicator related to the Request for trademark registration in the reference period the highest annual increase was 20.6%, and the annual average of requests in the reference period was 616. A significant increase will be considered in the case of this indicator if its value exceeds the annual average for the reference period by more than 20.6%).

Symbol for evaluating the trend of the indicator	Significance
	This score is given if the value of the indicator has changed insignificantly from the reference value.
-	Negative evolution of the indicator This score is given if, at the level of the analyzed indicator, a decrease is observed compared to the average of the value in the reference period. .
- -	Strongly negative evolution of the indicator This score is given if, at the level of the analyzed indicator, a significant decrease is observed compared to the average of the value in the reference period[58].

In line with the development vision from the perspective of smart specialization at the level of the South-East Development Region, the context of regional evolution will be monitored from the perspective of two dimensions: economic and socio-demographic. The context indicators are the following:

Nr. Crt.	Name of the indicator	Initial value T0	T1 (2023)	T2 (2025)	T3 (2027)	T4 (2029)	Average annual value
1.	Share of regional GDP in national GDP	10.26% (2017)					10,66%
2.	Share of active local units in total local active units at national level	11% (2018)					11,22%
3.	Share of innovative enterprises in total enterprises	16.9% (2014-2016)					0%[59]
4.	Expenditures with RDI activity at	82,953 (2018)					61.797,17

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[58] It is considered a significant value if the indicator will be below the most pronounced decrease weight recorded in the reference period.

[59] These data are collected by the National Institute of Statistics every 2 years. Data for 2018 were requested, but were not available at the time of elaborating this strategy. Moreover, the data collection methodology has been changed since 2018. For this reason, we do not estimate an average annual evolution for this indicator.

Nr. Crt.	Name of the indicator	Initial value T0	T1 (2023)	T2 (2025)	T3 (2027)	T4 (2029)	Average annual value
	regional level (Thousand lei)						
5.	Civil employed population at regional level (Thousand persons)	956 (2019)					969
6.	Regional GVA (millions of lei)	79,563.8 (2017)					16.470,8
7.	Requests for trademark registration at the regional level	732 (2019)					616,8
8.	Patent applications at regional level	134 (2019)					164,6
9.	Number of employees in research and development activity	2479 (2018)					2.119
10.	Rate of creation of the active enterprises	3.4 (2018)					2,9

6.2. Result indicators

In order to provide the most specific indications for the implementation of the strategy, specific objectives have been defined, the progress of which is quantified at the level of the result indicators presented below.

Nr. Crt.	Specific objective	Proposed indicator	Unit	Estimated evolutionary trend
1.	Strengthening research and innovation capacities at the	SMEs/research institutions/universities	Number	+

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Nr. Crt.	Specific objective	Proposed indicator	Unit	Estimated evolutionary trend
	level of academia, public and private environment;	introducing product or process innovations		
		Regional SMEs innovating in-house		
		Number of research-development-innovation projects developed in partnership, in the fields of smart specialization, supported		
2.	Increasing the competitiveness of areas with potential for smart specialization, by digitizing processes and using information systems;	Users of new digital products, services and applications developed by enterprises in the fields of smart specialization	Number	+
		Enterprises in the South-East region that reach a high level of digital intensity		
3.	Developing human resources skills for smart specialization, industrial transition and entrepreneurship;	Employees of SMEs completing alternative training programs for high-knowledge service activities (KISA)	Number	+
4.	Adoption of technologies at the level of smart specialization fields.	Number of projects aimed at the adoption of advanced technologies by entities operating in the fields of smart specialization financed	Number	+
		Patent applications submitted to the European Patent Office		

Nr. Crt.	Specific objective	Proposed indicator	Unit	Estimated evolutionary trend
		for products or processes		
		SMEs that introduce innovations at internal level		

6.3. Output indicators

At the level of the Regional Smart Specialization Strategy of the South-East Region, 7 strategic priorities have been defined, related to the areas of smart specialization, and 4 cross-cutting priorities, which will contribute synergistically to achieve the general objective and specific objectives proposed in the strategy. For these priorities, the following set of immediate achievement indicators has been defined.

Nr. Crt.	Priority	Proposed indicator	Unit	Estimated evolutionary trend
1.	**Strategic Priority 1**: Supporting the application of innovative solutions in ship design, construction and repair in order to minimize the negative impact on the environment	Enterprises receiving support in the field of engineering and shipping (of which: micro, small, medium, large)	Number	+
		Number of international partnerships involving innovative companies and research and development organizations in the region		
		Enterprises cooperating with research institutions in the field of engineering and shipping		
		Personnel involved in RDI activities in the field of ship building and repair, with increased professional skills		
2.	**Strategic Priority 2**: Development of smart transport	The value of digital services, products and processes developed for companies in the field of shipping		

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Nr. Crt.	Priority	Proposed indicator	Unit	Estimated evolutionary trend
	systems through the digitization of ports and shipping	Number of national and international partnerships involving research, development and innovation entities in the region carrying out activities in the field of digitalisation of shipping		
		Personnel involved in RDI activities trained to support the process of digitization of ports and shipping	Number	+
3.	**Strategic Priority 3:** Increasing the competitiveness of products and processes in the clothing industry through innovation	Number of funded projects involving the procurement of hardware and software tools required in the manufacturing process in the clothing ndustry		
		Enterprises receiving support (of which: micro, small, medium, large) in the field of clothing		
		Nominal value of clothing research and innovation equipment		
		Capacities created for business incubators in the field of clothing and textiles	Number	+
		Digital services and products developed for textile companies		
4.	**Strategic Priority 4:** Increasing the quality and quantity of food in the agri-food and biotechnology industries	Number of projects aimed at applying digital technologies and robotics in agriculture		
		Enterprises receiving support (of which: micro, small, medium, large) in the field of agriculture		
		Number of members of clusters / operational groups in the agri-food field at regional level		
		Digital services and products developed for agri-food enterprises		

Nr. Crt.	Priority	Proposed indicator	Unit	Estimated evolutionary trend
		SMEs in the field of agriculture that invest in skills development	Number	+
		Jobs created in entities receiving support in the field of agriculture and biotechnology		
		Number of initiatives to promote innovation and knowledge transfer in the agri-food sector		
		Public-private partnerships in the agri-food sector		
5.	**Strategic priority 5:** Retehnoligization in aquaculture and fisheries to support biodiversity and environmental protection.	Number of projects funded in the field of aquaculture and fisheries	Number	+
		Supported enterprises (of which: micro, small, medium, large) in the field of aquaculture and fisheries		
		Newly established enterprises receiving support in the field of aquaculture and fisheries		
		Research institutions participating in joint research projects in the field of aquaculture and fisheries		
		Enterprises cooperating with research institutions in the field of aquaculture and fisheries		
		National and international partnerships to support innovation in aquaculture		
6.	**Strategic Priority 6**: Support the implementation of innovative solutions	Number of projects aimed at the acquisition of software tools and hardware equipment necessary for the management and promotion of tourist services		

Nr. Crt.	Priority	Proposed indicator	Unit	Estimated evolutionary trend
	in the provision and promotion of tourism services	Enterprises that benefit from support (of which: micro, small, medium, large) in the field of tourism	Number	+
7.	**Strategic priority 7:** Support the adoption of SMART CITY solutions at the regional level	Number of projects aimed at carrying out RDI activities in the field of SMART CITY solutions	Number	+
		Public institutions that receive support to develop digital services and applications		
		Users of new public digital services and applications		
		Enterprises that achieve a high level of digital intensity		
		Public institutions supported to develop digital services, products and processes		
8.	**Cross-cutting priority 1:** Supporting the application of key enabling technologies (KETs) at the level of smart specialization areas	Projects that provide essential generic technologies or Key Enabling Technologies - KET	Number	+
		Employees of SMEs completing alternative training programs for high knowledge service activities (KISA)		
9.	**Cross-cutting priority 2:** Digital transformation through supporting the implementation of information and communication technology (ICT) at	Number of projects aimed at procuring the hardware equipment and software tools needed for computerization and technology transfer	Number	
		Employees of SMEs completing alternative training programs for high-knowledge service activities (KISA)		

Nr. Crt.	Priority	Proposed indicator	Unit	Estimated evolutionary trend
	the level of smart specialization areas	Public institutions supported to develop digital services, products and processes		
		Number of regional Digital Innovation Hubs funded for the dissemination of digital capabilities in the regional economy		
10.	**Cross-cutting priority 3:** Supporting the work of organizations carrying out research, development and innovation;	Number of projects aimed at procuring the machinery, hardware and software tools needed for innovation and / or research / development	Number	+
		Partnerships with entities at national or international level operating in areas of similar activity in which the RDI element is integrated, to ensure an exchange of experience and / or specialized staff		
		Number of patents acquired by small and medium-sized enterprises in the South-East Region		
11.	**Cross-cutting priority 4:** Development of human capital involved in research - development and innovation activities	Number of competitions organized for young people with prizes for RDI activities	Number	+
		Number of specialization courses with Romanian and foreign experts, organized in order to improve the skills of researchers and similar staff in the region		

Chapter VII. Conclusions

In the 2014-2020 programming period, the South-East Development Region started the transition from competitiveness based on labor, natural resources and investments, to one based on innovation, the latter involving the development of research capacity in high-tech fields, value-added generators with the potential to spread and drive other productive sectors. The research and innovation have a direct effect on job creation, economic development and, implicitly, on increasing the quality of life.

The analysis elaborated in this strategy based on statistical information, performed for the most important socio-economic indicators and for the indicators related to the field of research-development-innovation, highlights the progress at the level of the South-East Development Region, which is still below the national average. However, the region has the potential for the economic and social development in recent years, especially due to the fact that the mechanisms and governance framework have already been created since 2017, when a first Smart Specialization Strategy was developed and was set up the Regional Innovation Consortium.

The indicators analyzed at the level of the Strategy reveal that the Gross Domestic Product (GDP) of the South-East Region increased by 14.33% in the period 2014-2017. However, the region's GDP as a percentage of national GDP decreased by 1%, during the same period, the South-East Development Region being thus overtaken by the Center and North-East Regions. At regional level, Constanța County has been the most developed county in the region in recent years, contributing 41% to the region's GDP in 2017. Analyzing the position of the South-East Development Region at national level, it occupies in 2017, the fifth position in terms of the value of the regional gross domestic product / inhabitant from the national average, being exceeded by the following development regions: Bucharest-Ilfov, West, Center and North-West, fact that ranks the region at a medium level of development, compared to the other development regions of Romania.

The analysis of the gross value added (GVA) by sectors of activity of the national economy revealed that the South-East Development Region ranks 2nd at national level in agriculture, forestry and fisheries, with a gross value added of 6,701.3 million lei, being exceeded by the North-West Region by a little over 100 million lei. However, it is important to note that the largest activity in terms of aquaculture and fishing, at national level, takes place within the South-East Development Region, which has access to a significant part of the Danube River, as well as to the Black Sea, respectively the Danube Delta. Also, the analysis of exports by sections of the combined nomenclature reveals that in the Region, Brăila County has high agricultural potential, the Revealed Competitive Advantage (RCA) indicator increasing from -0.2 in 2017 to 0.99 in 2019.

Although the South-East Region ranks last at national level in terms of competitiveness in the information and communication technology, this economic sector has seen a positive development. At the level of Galati county there is a good context for smart growth and specialization. In this sense, Galati County is on the 1st place at regional level in terms of GVA in the field of information and communication technology, and the Galati Software Park creates the optimal context for an exponential increase in the performance of this field.

Tourism is an area with very high development potential in the region. The South-East region includes almost all forms of relief: the Danube Meadow, the Bărăgan Plain, the Dobrogea Plateau with the Măcin Mountains, and the northwestern part of the region includes part of the Carpathians and the Curvature Subcarpathians. At the same time, the region is crossed by the Danube river, includes the Danube Delta and is bordered on the east by the entire Romanian Black Sea coast. All these characteristics favor the development of the traditional tourism (mountain tourism, seaside tourism), spa tourism and even niche tourism (for example, wine tourism).

Last but not least, the analysis of the exports by sections of the combined nomenclature reveals certain competitive advantages of the South-East Development Region, especially in terms of textiles and textile articles, Vrancea County still concentrating a significant share of factories operating in the field of clothing. However, given the competitive advantages that some countries have in this area, in order to increase the competitiveness and performance of the textile industry in the region in an international context, it is necessary to adopt a strategic approach based on supporting innovation and promoting the retehnologization.

Considering the indicators analyzed at the level of the Regional Smart Specialization Strategy of the South-East Region 2021-2027, as well as the socio-economic specificities at regional level, the following areas of smart specialization were identified:

- Engineering and shipping;
- Clothing industry;
- Agri-food and biotechnologies;
- Aquaculture and fishing;
- Tourism;
- ICT - Information and Communication Technology.

Therefore, it is important to mention that the areas of smart specialization identified for the South-East Development Region have a high potential for launching and capitalizing on the region's research, development and innovation activities, creating an appropriate framework and context that capitalizes, in the first place, on the regional advantages.

With regard to the regional governance, it has been established, following the specialized analysis of some strategic documents, that regional development involves a process of involvement of institutions, as well as close cooperation between public authorities, economic agents and social groups at all levels. Thus, at the core of regional development, an important role is played by aspects such as building partnerships, planning and good governance.

Moreover, from the point of view of the smart specialization process, the concept of regional governance involves ensuring the participation of a wide range of key actors, from public authorities, universities and research institutes, investors and enterprises, to civil society actors, so that the governance model involve both the market and the civil society. Although the regional development is a collective effort, involving central institutions, the regional level is the most important part of the process, given that the key actors at this level know best the territorial reality and the existing needs.

As the smart specialization process is strongly driven by the strategic objectives at the level of the European Union, the Smart Specialization Strategy of the South-East Region intends to align with the main European policy objectives such as:

- **a smarter Europe** (by promoting innovative and smart economic transformation),
- **a greener**, carbon-free **Europe**,
- **a more connected Europe** (regional ICT mobility and connectivity),
- **a more social Europe** (implementation of the European Pillar of Social Rights),
- **a Europe closer to the citizens** (sustainable and integrated development of urban, rural and coastal areas through local initiatives).

Thus, the Smart Specialization Strategy of the South-East Region for the period 2021-2027 is based on the information contained in the socio-economic analysis and the SWOT analysis, dedicated to the field. At the same time, in the elaboration of this document were considered strategic documents elaborated at European level (Europe 2020 Strategy) and national (Partnership Agreement, National Smart Specialization Strategy, National Strategy for Research, Development and Innovation) were considered, as well as analyzes and previous studies for the South-East Development Region.

Therefore, the Strategy is built on a sound analysis of the current regional assets and technologies and is based on the principle of partnership between enterprises, public entities, civil society and knowledge institutions at regional level.

At the basis of the identification of the strategic priorities of the strategy, the principle of granularity was taken into account, the objective being to identify the relevant level between the activity sectors and micro-activities where a smart specialization is possible through research - development and innovation. The process of selecting priorities was also the critical mass and / or the critical potential

of some economic areas in the region. Following the identification of priorities, they were divided into cross-cutting priorities and priorities on areas of smart specialization.

Thus, among the cross-cutting priorities of the strategy there can be listed:

1. Supporting the application of key enabling technologies (KET) at the level of smart specialization areas;
2. Digital transformation by supporting the implementation of information and communication technology (ICT) at the level of smart specialization areas;
3. Supporting the activity of organizations carrying out research - development and innovation activities;
4. Development of human capital involved in research - development and innovation activities.

In terms of strategic priorities in the areas of smart specialization, they are the following:

1. Supporting the application of innovative solutions in the design, construction and repair of ships in order to minimize the negative impact on the environment;
2. Development of smart transport systems through the digitization of ports and naval transport;
3. Increasing the competitiveness of products and processes in the clothing industry through innovation;
4. Increasing the quality and quantity of food in the agri-food industry and biotechnologies;
5. Retraining in aquaculture and fisheries to support biodiversity and environmental protection;
6. Supporting the implementation of innovative solutions in the provision and promotion of tourist services;
7. Supporting the adoption of SMART CITY solutions at the regional level.

As a result of outlining the objectives and priorities of the strategy, it was necessary to identify the sources of funding through which the measures established at the level of the strategy can be implemented. The policy mix and the action plan for the Strategy were also defined.

The action plan includes medium and long-term public policies and actions, available at regional and local level to support the public and private sector in investing in the region's key priorities, facilitating the transition to a knowledge-based society and digital transformation. Its role is to establish concrete tools and modalities to support the achievement of the specific objectives established in this strategy.

A list of pilot projects was identified and detailed, starting from the entrepreneurial discovery process, in which 6 such events were organized, at the level of each area of smart specialization identified in the strategy. Thus, the proposed action plan, related to the strategy, reveals the efforts of key actors, through the active involvement of stakeholders, defined as a quadruple helix: business, academia, public institutions and civil society.

Multiple sources of funding have also been identified, in the context in which, for the next programming period (2021-2027), Policy Objective (OP) 1 focuses exclusively on promoting innovative and smart economic transformation. These sources of funding include both national operational programs and funds managed at European level, such as:

- Horizon Europe;
- South-East Regional Operational Program 2021 - 2027;
- Technical Assistance Operational Program 2021-2027;
- Education and Employment Operational Program 2021-2027;
- Just Transition Operational Program 2021-2027;
- InvestEU 2021-2027 program;
- Smart Growth, Digitization and Financial Instruments Operational Program (POCIDIF).

Finally, in order to ensure a good implementation of the Strategy, robust and evidence-based monitoring and evaluation mechanisms have been released. Thus, a monitoring and evaluation plan was defined covering the entire implementation period of the Strategy, as well as the key milestones, for which both intermediate implementation evaluations and ex-post and impact evaluations of measures proposed in this strategy will be carried out.

Also, the proposed indicators, both for monitoring and for the evaluation process of the Smart Specialization Strategy of the South-East Region 2021-2027, are based on the regional context and the smart specialization objectives of the Region, as well as they are extensively correlated with the available funding sources and their priority axes.

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Annexes

Annex 1. Project portfolio

Project portfolio – Domeniul inginerie și transport naval		
1.	**Project title**	**Improving the practical training of naval transport personnel by digital means**
	Project applicant	CERONAV - Romanian Center for the Training and Development of Naval Transport Personnel
	Contacts	Mihaela Vintilă mihaelavintila@ceronav.ro
	Location of the project	Constanța Galați
	Project objectives	General objective: Developing institutional capacity and multilevel cooperation between shipping education and training institutes and key actors in the field to provide educational methods and technologies for practical, distance learning of students, cadets and navigators based on instruments and digital technologies maintaining the high standard of the educational system. Specific objectives: -Improving the naval educational level and the personnel involved in the training and instruction activity by developing innovative methods for education, training and evaluation of competencies using digital tools and applications. -Improving the capacity of naval education and training institutes to provide training in practical skills and abilities, in accordance with EU requirements and IMO standards, through innovative teaching / training methods. -Training / Development of digital skills of teachers / trainers in the shipping sector to use new pedagogical and methodological approaches and innovative technologies in order to transfer practical skills to students.
	Project justification: needs identified in the region / county / locality	Shipping plays a key role in global logistics, being used for about 90% of the world's cargo volume, so this area is very strictly regulated and monitored, both operationally and formally. Marine education is based on two components: initial training and continuing education. In both components of educational training, learning based on the training of practical skills is predominant, due to the specificity of the maritime sector. Given that the maritime sector is an industry with demanding and ever-changing training requirements, maritime education must adapt to it and provide training that is accessible to all, without being restricted in time and place. Under these conditions, e-learning is proving to be the most appropriate solution for training. The emergence of the pandemic situation imposed the need for the accelerated development of online marine education. If the initial training didactic activities (courses, seminars) could be transferred to the online environment, the practical training activities through simulation could not be transferred to this environment, due to the lack of communication technologies, at a distance, between simulators and student terminals. Therefore, in order to maintain the standards of practical training of students / trainees imposed by the requirements of STCW (International Convention on

		Standards of Training of Navigators, Patenting / Attestation and Chartering) it is necessary to identify and implement technical solutions for access to naval simulators. from a distance, which does not currently exist and therefore have not been implemented anywhere in Europe, as well as pedagogical methods for conducting training on simulators in the online environment.
		By implementing practical training in the online environment
		- will increase the accessibility to training by eliminating space and time barriers, both for students / learners (any student, of any nationality, can participate in training from anywhere in the world), but also for other categories of actors in the maritime field (shipping, crewing companies, etc.)
		- administrative costs (accommodation, transport, food) will be eliminated
		- tuition fees for students will be reduced
		- improving learning flexibility for students / learners, who can learn in any environment conducive to them and at their own pace
		- the development of self-learning will be supported
		- increase the digital skills of students / learners and teachers / instructors
		Also, the technical and pedagogical solutions for the transfer of training on simulators in the online environment have the potential of applicability, worldwide, both in other universities and training centers for seafarers, as well as in other technical fields of education and training that use simulators in the training activity.
	The nature of state aid	Grants with non-reimbursable financing
	The main activities of the project	1. Identification and implementation of technologies that can be adapted to the naval field for practical distance learning in digitalized system and providers that can provide digital technologies.
		2. Development of solutions regarding the practical distance learning in digitalized system.
		3. Identifying the educational modules that can be adapted for digital solutions and identifying psycho-pedagogical methods that can be adapted to the new technology used and the proposed / adapted modules.
		4. Preparation for practical training in the virtual environment.
		5. Assessment of developed skills (feedback students, employers on skills developed).
		6. Follow-up and dissemination of the results obtained.
	Complementarity with other projects	Research projects in progress by ANMB:
		- Innovative internships for the acquisition of skills in economic sectors with competitive potential, POCU, SMIS Code: 133383;
		- Strategic partnership for supporting Blue Growth by enhancing Maritime Higher Education maritime cooperation framework on marine pollution and environment protection field. Erasmus, KA203.
	Implementation period	36 months
	Key achievements	Methodology / Comparative grid between different digital technologies (on accessibility and costs for both learners and institutions).
		Implementation of pilot solutions for practical distance learning in digital system.
		Methodologies for training and remote assessment of practical skills with digital technology.
		Courses for the training of instructors and teachers, on how to train and evaluate through the identified methods.
		Trainers trained in how to use new technologies;
		Tutorials for students / trainees on new methods of practical, distance learning training online;
		Good practice guide for trainers on the use of practical training in the virtual environment.

		Evaluative research studies on the use of training methods implemented in the project (feedback analysis). Project promotion website. Produced articles sent to specialized publications. Presentation of project results in the media. Promoting the results of the project at events in the field of activity of the partner institutions and on their websites. Information and publicity events.
	Current stage of the project (evaluation of the maturity stage of the project)	Information collected by CERONAV from other training centers / universities / naval academies in Europe facing the same problems and needs Research Studies: Online Marine Higher Education. Evaluative research report. D. Cosofret, R. Avram, A. Bautu. Ed. ANMB, ISBN: 9786 066 422 062, (2020). Research projects in progress by ANMB: - Innovative internships for the acquisition of skills in economic sectors with competitive potential, POCU, SMIS Code: 133383; - Strategic partnership for supporting Blue Growth by enhancing Maritime Higher Education maritime cooperation framework on marine pollution and environment protection field. Erasmus, KA203. Scientific articles: - The use of low-cost software in search and rescue training courses for maritime students. DV Atodiresei, A Toma, A Bautu, eLearning & Software for Education 1, "CAROL I" National Defense University Publishing House, (2018); -Evaluation of the Maritime Higher Education didactic support during the pandemic coronavirus. Case Study Doru Coșofreţ, Elena-Rita Avram. The 15th International Conference on Virtual Learning- Virtual Reality, ISSN: 1844-8933 - ISI Proceedings, (2020) ;. - Challenges in the Maritime Higher Education from the perspective of implementing the online teaching and evaluation activities. Elena-Rita Avram, Doru Coșofreţ. The 15th International Conference on Virtual Learning- Virtual Reality, ISSN: 1844-8933, (2020) ;. - Developing multidisciplinary blended learning courses for maritime education with cross-European collaboration. Evangelos Boulougouris1 & Panagiotis Mizythras1 & Leonidas Chrysinas2 & Georgios Vavourakis2 & Gerasimos Theotokatos1 & Murat Aymelek3,4 & Ismail Kurt. WMU Journal of Maritime Affairs (2019) 18: 319–340. - Online Teaching Technique in Maritime Learning Process. Stan, L. C. Procedia - Social and Behavioral Sciences 116. 4517 - 4520. (2014)
	Risks	Administrative risks, bureaucracy
2.	**Project title**	**Implementation of innovative technologies in terrestrial monitoring and bathymetric determinations in port areas to control and reduce clogging of berthing infrastructure in Danube seaports.**
	Project applicant	UPIR - Union of Romanian Inland Ports
	Contacts	Carmen Mariana Costache office@danube-ports.ro
	Location of the project	Galați
	Project objectives	General objective: Digitization of processes in activities to ensure optimal airworthiness conditions in Danube ports. Specific objectives: - Implementation of autonomous monitoring systems and terrestrial and bathymetric measurements.

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		- Creation of the statistical database and implementation of innovative simulation solutions for the elaboration of studies and predictions regarding the airworthiness conditions in the targeted ports.
	Project justification: needs identified in the region / county / locality	The identified need: streamlining the consumption of resources and reducing the impact on the environment in the activity of ensuring the navigability conditions in the Danube ports.
	The nature of state aid	Grants with non-reimbursable financing
	The main activities of the project	1. Analysis of the existing situation; 2. Inventory of innovative monitoring and prediction solutions; 3. Monitoring the clogging phenomenon in the critical points; 4. Identifying solutions to reduce clogging; 5. Implementation planning; 6. Implementation; 7. Dissemination.
	Complementarity with other projects	PROJECT: "REXDAN-Integrated system of research and complex monitoring of the environment in the Danube river area" promoted by UGAL
	Implementation period	36 months
	Key achievements	Identifying critical points. Selection of applicable innovative solutions. Creating the database. Technical proposal. Strategy, action plan. Data collection, storage and processing system. Good practice guide; technological information workshops. PROJECT: "REXDAN-Integrated system of research and complex monitoring of the environment in the Danube river area" promoted by UGAL Existence of the advanced research base in the field of hydromechanics at UGAL Signing the collaboration protocol between UGAL and the port and waterway administrations for the initiation of joint actions in order to innovate the naval field Creation of the RRT naval cluster
	Current stage of the project (evaluation of the maturity stage of the project)	PROJECT: "REXDAN-Integrated system of research and complex monitoring of the environment in the Danube river area" promoted by UGAL Existence of the advanced research base in the field of hydromechanics at UGAL Signing the collaboration protocol between UGAL and the port and waterway administrations for the initiation of joint actions in order to innovate the naval field Creation of the RRT naval cluster
	Risks	Administrative risks, bureaucracy
3.	**Project title**	**SMART DANUBE PORTS**
	Project applicant	UPIR - Union of Romanian Inland Ports
	Contacts	Carmen Mariana Costache office@danube-ports.ro
	Location of the project	Galați
	Project objectives	General objective: Sustainable integration of Danube ports in intermodal logistics flows of goods and passengers. Specific objectives:

		-Digitalization of information flows from the port community and their integration on the Rhine-Danube corridor. -Efficiency in port operations and intermodal transfer by implementing environmentally friendly innovative technologies. Implementation of VR technologies to adapt the skills of the port workforce to new technologies with application in the port field.
	Project justification: needs identified in the region / county / locality	Identified need: Increasing the competitiveness of Romanian ports and adapting to the challenges of technological change.
	The nature of state aid	Identified need: Increasing the competitiveness of Romanian ports and adapting to the challenges of technological change.
	The main activities of the project	1. Digitization of information flows within the port community; 2. Identifying the innovation needs of port technologies; 3. Selection of sustainable sustainable solutions applicable in the port field; 4. Creating the support framework for adapting the workforce in ports to the requirements of refurbishment.
	Complementarity with other projects	-
	Implementation period	36 months
	Key achievements	Implementation of PCS type applications in Romanian ports. Technological audit. Strategy and action plan for refurbishment. Creation of a virtual training center and assessment of labor skills in ports. Good practice guide.
	Current stage of the project (evaluation of the maturity stage of the project)	The TRAINING4PORTS project implemented by UPIR, financed by the START program, through which the analysis of the labor market in the port field in Romania, Ukraine and the Republic of Moldova and the offer of available training services was performed. FEPORT study in collaboration with ESPO on the impact of new port technologies on the workforce. Studies initiated by the Port Dialogue Social Dialogue Commission within the European Commission on the social impact of port changes. Guide on creating the appropriate framework for improving the skills of port workers developed by the ILO. ESPO study on port adaptation to new generations of seagoing vessels. ESPO GREEN PORT GUIDE - the best practice guide for reducing the negative effects of port activity on the environment.
	Risks	Administrative risks, bureaucracy
4.	Project title	**DANUBIUS-RI: The International Centre for Advanced Studies on River-Sea Systems**
	Project applicant	GeoEcoMar-INSB-INCDDD
	Contacts	astanica@geoecomar.ro;manuelasidoroff@yahoo.com;office@ddni.ro
	Location of the project	Tulcea
	Project objectives	DANUBIUS-RI is the first pan-European infrastructure project that brings together specialists from all fields relevant to the study of freshwater environments with those in the marine field. The project is thus the first to pay special attention to processes in transition environments (deltas and estuaries). Both through its structure - and through its operating logic, DANUBIUS-RI will support research activities that will follow phenomena from the river-sea continuum in an integrated way that will encourage interdisciplinarity (from observations / field measurements

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		to analyzes, modeling and the integration of natural and social and economic aspects for the implementation of governance plans). The realization of the Romanian components of DANUBIUS-RI will provide the optimal framework for: • study of the processes that influence the evolution of ecosystems in wetlands - river, delta and coast; • developing a knowledge-based economy to support sustainable economic growth in the Danube-Danube Delta system, while protecting natural biodiversity; • education through master's, doctoral and post-doctoral programs in collaboration with universities across Europe; • involvement in the academic and economic community through conferences, specialized training courses, workshops, summer schools, development of e-learning facilities and ecological educational programs for local communities and tourists.
	Project justification: needs identified in the region / county / locality	The River-Sea system is a complex system whose ecosystem and adaptive management is vital, and the lever through which it is achieved is the geo-informatics system with the following attributions: a / assess the ecological status of the natural heritage, b / organizes the scientific research and ensures the necessary measures for the conservation and protection of the genofond and biodiversity; c / establishes and applies the measures of ecological reconstruction of the degraded ecosystems; d / evaluates the state of natural resources and their level of capitalization, in accordance with their regeneration potential and the support capacity of ecosystems; e / supports the exercise of control over the application of the provisions of the decisional management; f / supports and protects the traditional economic activities of the local population; g / supports the spatial planning and urbanism plans on the territory of the reservation, elaborated according to the law; h / promotes research activities and international scientific cooperation; i / provides support for ecological information and education actions; j / cooperates with the interdepartmental commissions and the county commissions for defense against calamities or catastrophes; k / collaborates with the public administration authorities to protect the interests of the locals, as well as to increase the quality of life and the standard of civilization; o / contributes to the elaboration of traffic and access rules on the arms of the Danube for boats, barges, river and sea vessels;
	The nature of state aid	Grants with non-reimbursable financing
	The main activities of the project	The research infrastructure will provide tools for: System characterization -Origin and evolution of RS systems Genesis of the river and basin; geological structure; The dynamics of the earth's crust and the evolution of the river; river-sea interactions (relationship with sea level changes and connections with other basins; delta formation; evolution of depocenters). -Neo-tectonic geodynamic processes; uplift processes in orogenic areas and the formation and evolution of river terraces; sediment yielding and compaction; correlation with the evolution of the system. -Hydrology, hydrodynamics and sedimentology Water flows and sediments in RS systems; sediment cycle (source-transfer-sink); bio- and geo-chemistry of water and sediments in the whole system; hydrodynamic processes at RS interfaces and in coastal wetlands.

		-Pollutants and ecotoxicology Identification and characterization of existing and emerging pollutants and pathogens; establishing entrances and destiny; assessment of adverse biological effects (eg genotoxicity, mutagenicity and endocrine disruption); assessment of inputs and fate in RS systems; hazard and risk assessment and implications for the environment and human health -Evaluation and function of ecosystems Environmental changes -In situ observations of the ecosystem -Earth observation and remote sensing of sediment dynamics and seabed conditions. -Geo-hazards and risk assessment -Modeling, simulation and testing of hypotheses Predictive tools for assessing the response to the environment; climate and environmental change modeling, including the impact on the RS system; the effects of extreme events on the system; the impact of rising sea levels; future scenarios of environmental change on ecosystem function. -Anthogenic impact on ecosystem goods and services Damage caused by anthropogenic activity on ecosystems; assessing the social dynamics of local communities and identifying economic opportunities for sustainable development, while reducing biodiversity loss; assessment of capture factors and climate change on ecosystem function, goods and services. Adaptive and sustainable management -Adaptive and participatory ecosystem management Providing the scientific basis for the sustainable management of RS systems using an appropriate range of methods and models. -Conservation and restoration of nature Improvement of ecological status, restoration of habitat, bioremediation, restoration of connectivity; guidelines for the conservation of endangered species and habitats; implementation of EU environmental legislation; assessment of invasive species. -Evaluation and assessment studies of natural resources that promote the sustainable management of biotic and abiotic resources through knowledge-based development and the use of a wide range of methods and models (eg assessment of ecosystem services).
	Complementarity with other projects	DANUBIUS RI will strengthen European research in the field of aquatic ecosystems and marine sciences by developing and using analytical, observational, modeling and data management facilities in RI. In doing so, there are opportunities to build on previous research initiatives on river, estuarine and rift ecosystems and to actively contribute to initiatives, including terrestrial ocean interactions in the coastal zone (LOICZ), the World Climate Research Program (WCRP) and GEP International Waters. Moreover, DANUBIUS-RI will provide a platform for the development of new and existing European partnerships; harnessing new opportunities for the European research community, while responsibly cultivating business partnerships and applied science opportunities in the management of large SR systems around the world. The broader imperative for this infrastructure is exemplified by river and coastal flood research. This requires the integrated management of coastal - coastal systems, supported by innovative interdisciplinary environmental research. This need is adapted at the international level and addresses the challenge of advancing the holistic management of river-coastal systems. Therefore, it is important that a new integrated management and scientific support base be developed for RS and coastal systems to advance the goal of sustainable management of these systems, as foreseen by IGBP / LOICZ (Earth-Ocean Interactions Project in coastal zone of the

		UN International Geosphere Biosphere Program). For example, the best use should be made of the capabilities offered by the European Space Agency's (ESA) Copernicus program and the Global Earth Observation System (GEOSS). This new integrated approach to large RS systems will address the recommendations of the World Business Council for Sustainable Development: supporting environmental health also means ensuring the economy, because ultimately "business cannot function if the ecosystems and services it provides - such as water, biodiversity, fiber, food and climate - are degraded or unbalanced ". (MEA, 2005).
	Implementation period	60 months
	Key achievements	Assessment of the biotic and abiotic state of RS ecosystems; system pollution, eutrophication, toxicity, biodiversity; energy transfer through food chains, population dynamics and ecosystem function; the role of the RS system in the biogeochemical cycle, greenhouse gas flows in wetlands, lakes and the sea; ecosystem changes, the transition to less desirable species, implications for ecosystem function and impacts on human health. Permanent and permanent evaluation of the quality of the environment in RS systems; application of new types of sensors and equipment online (including micro and mesocosm techniques); use of biomarkers; establishing long-term data series to study process changes. Land and water characterization in RS systems; monitoring morphological and hydrological changes; reconstituting change in recent ca. 20 years from the archived data; studying and monitoring water currents and river feathers; eutrophic conditions; Understanding extreme events, their natural and anthropogenic mechanisms of triggering at different scales, such as floods, currents, landslides, storms; earthquakes; instability of the slope on the continental edge; geo-hazards from gas hydrates. Assessing development scenarios for sustainable use An interdisciplinary and holistic approach to the development of new sustainable management strategies. Develop methods and apply / test decision support systems (DSS) and multi-criteria decision aids (MCDA).
	Current stage of the project (evaluation of the maturity stage of the project)	The collaboration between GeoEcoMar and INCDSB for the realization of the Pan-European Distributed Infrastructure Project "International Center for Advanced Studies for River Systems - Sea" started in 2010. In partnership all the steps achieved so far have been successfully completed, culminating in the title of Flag Project for the EU Strategy for the Danube Region (September 2013) and - most importantly - the acceptance as an ESFRI project on the ESFRI Roadmap 2016 (pan-European competition from March 2015). Until the receipt of DANUBIUS-RI on the list of ESFRI projects, there was a Partnership Agreement between GeoEcoMar and INCDSB, which aimed at working together to include DANUBIUS-RI on the ESFRI list. After achieving this goal, INCD GeoEcoMar and INCDSB signed (April 3, 2016, approved by ANCSI on April 4, 2016) a new partnership agreement, which establishes that GeoEcoMar is the coordinator of the pan-European distributed research infrastructure project ESFRI DANUBIUS - RI, while INCDSB is the coordinator of the construction activities of the Murighiol Hub and the access to the Structural Funds for this purpose; both institutions will be involved in these activities. INCDSB, GeoEcoMar, INCDDD and Academia RO worked together in numerous consortia in the stages that led to what is today DANUBIUS-RI. Consequently, the synergy and complementarity of the implementation teams support a good approach in avoiding the potential risks related to the technique and tools used by the research team.

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	Risks	New elements appear in the project implementation that will require the involvement of new specialists, where there may be risks related to their integration in the implementation team, in the project theme, especially related to the short project implementation period and the concrete results to be obtained. However, given the expertise of INCDSB and GeoEcoMar in coordinating and successfully achieving all the objectives of DANUBIUS-RI so far, the activities of DANUBIUS-PP or FP7 DANCERS implemented with teams of over 20 participants / institutions, many of them with limited experience In this project, we consider that potential implementation risks can be avoided or corrected. Through the DANS Project financed by MCI, the SF of this project was realized.
5.	**Project title**	**ENERGY AND ENVIRONMENT -** **Optimal use of conventional and unconventional water resources**
	Project applicant	Danube Delta National Research and Development Institute
	Contacts	Iulian NICHERSU- iulian.nichersu@ddni.ro
	Location of the project	Tulcea
	Project objectives	The following aspects are taken into account by the Master Plan in order to establish the proposed measures for the control of the erosion risk, respectively: • Extensive geomorphological review of the area using existing studies, published literature, new field studies, hydraulic and sediment modeling studies and a specialized interpretation of the data. • The Master Plan aims to implement a sustainable coastal risk management system, which achieves as many objectives as possible for Biodiversity Conservation and the economy while working with natural processes whenever possible. • In addition to taking into account the structural forms of coastal defense, such as the construction of new coastal protection works - St. George, Sulina, the Master Plan will also consider non-structural measures as a strategy for reducing future risks, such as avoiding the development of erosion in high-risk areas and adapting to changes in the coastal zone through relocation or land use change. The overall objective of this Master Plan is to protect and improve the quality of the environment and living standards along the Romanian coastal area of the Black Sea and to increase safety in the southern part of the coast, which has been seriously threatened by destructive effects. of coastal erosion. The specific objectives are: • Development of a program and related rehabilitation works on the protection of the coast from the effects of coastal erosion in order to rehabilitate and protect the shoreline, adjacent lands and land and marine ecosystems; • Protecting the economic infrastructure and social objectives endangered by marine erosion processes; • Implementation of an integrated coastal zone monitoring program to support medium and long term operations and maintenance (30 years).
	Project justification: needs identified in the region / county / locality	Carrying out a Study - MP - MASTER PLAN REGARDING THE PROTECTION AND REHABILITATION OF THE COASTAL AREA in the RBDD - Sulina - Sf. Gheorghe area. MASTER PLAN sets priorities for the rehabilitation of the coastal area of the Romanian coast, placing a strong emphasis on restoring and improving the environment. An essential requirement for the development of the best technical solutions in the Master Plan was to establish the causes that determine the erosion of the coastal area, and what is in danger if no intervention is taken at all. In this sense, the geomorphology of the area and the history of the evolution of the shore line were studied, including both natural and anthropogenic influences.
	The nature of state aid	Grants with non-reimbursable financing

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	The main activities of the project	• Analysis of the existing situation in terms of the state of existing hydrotechnical constructions and the level of erosion of the coastal area, through field studies and analysis of all available data and division of areas according to the degree of risk of erosion. • Establishing the critical points in the studied area from the point of view of coastal zone erosion and forecasts regarding the evolution of coastal area erosion in the situation of non-implementation of the master plan and in the situation of carrying out the necessary works to achieve the objective of the master plan. • The analysis of the possible variants to be applicable for each area with the consideration of all the restrictions imposed by the legislation in force, of the cost analysis. • Analysis of possible variants to be applicable for each area, taking into account all the restrictions imposed by the legislation in force, the analysis of the costs and conclusions of the environmental report and the appropriate assessment study. • Establishing the intervention modalities for each case taking into account the impact on the environment as well as the impact on the species and habitats in the protected natural areas declared in the studied area. • Preparation of an action plan for the implementation of the master plan with short, medium and long term measures
	Complementarity with other projects	-
	Implementation period	48 months
	Key achievements	Master Plan for the Rehabilitation of the Coastal Area in the Northern Unit - Sulina-Sf. Gheorghe.
	Current stage of the project (evaluation of the maturity stage of the project)	-
	Risks	External expertise is required for design including technical assistance for space design, specific works; Assistance for interventions in the natural environment (sampling, specific analyzes, etc.) Administrative risks, bureaucracy
6.	**Project title**	**Solutions for using unconventional energies (solar, wind) to supply the localities in RBDD.**
	Project applicant	Danube Delta National Research and Development Institute
	Contacts	Matei Simionov- matei.simionov@ddni.ro
	Location of the project	Tulcea
	Project objectives	Facilitate the implementation of technical solutions for the use of renewable sources to partially / totally cover the need for electricity and / or heat in the DDBR. Raising awareness among the population about the importance of using alternative energy sources for sustainable development.
	Project justification: needs identified in the region / county / locality	This project aims to use emerging energy processes and technologies in order to promote the use of renewable energy sources (solar and wind) in the ITI area, in the context of climate change adaptation. This study supports the European Directive which regulates that by 2030, at least 27% of the total energy consumed in the EU should come from renewable sources.
	The nature of state aid	Grants with non-reimbursable financing
	The main activities of the project	• Evaluation of solar and wind energy potential in DDBR. Creating a database for estimating the energy potential of the DDBR. • Assessment of energy needs by different categories of consumers (domestic, non-domestic and commercial)

		• Determining the optimal constructive solutions for the use of renewable electricity and heat sources depending on the type of consumer in the DDBR • Raising awareness among the population on the use of renewable sources of electricity and heat (solar panels, photovoltaic and wind turbines) compared to the use of conventional sources.
	Complementarity with other projects	-
	Implementation period	36 months
	Key achievements	Map of areas of RBDD with high energy potential (solar and wind). Local construction solutions (all localities in the DDBR) to cover the electricity and heat needs of consumers in the DDBR using renewable sources of electricity and heat. The open-access online platform for the analysis of the constructive solutions necessary for the use of renewable solar and wind energy sources in RBDD.
	Current stage of the project (evaluation of the maturity stage of the project)	-
	Risks	Administrative risks, bureaucracy
7.	**Project title**	**Security Operation Center Naval Fluvial**
	Project applicant	University of the Lower Danube Galati
	Contacts	Catalin Arama
	Location of the project	Galați
	Project objectives	The project proposal aims at the open collaboration of the consortium with public and private partners in order to develop intelligent specialization services and cyber security for public administration and the private environment using port and naval infrastructures in Romanian inland waters, for the development of valuable specialized products and services. added high specific field of high specialization, cyber security. The objectives of the proposed project are the following: • Carrying out the SOC in order to be able to provide specialized cyber security services to the interested actors in the target market; • Development of services and products specific to the field of cyber security; • Improving the degree of early detection, monitoring, analysis and response to cyber threats; • Increasing the level of smart specialization at regional level; • Intelligent use of ICT resources in order to provide unitary specialized cyber security services to target market actors; • Coagulation of a multidisciplinary team of high specialization in the field of cyber security; • Implementation of models for the development of services and businesses based on the intelligent sharing of resources and knowledge in the field of cyber security; • Training and improvement of human resources.
	Project justification: needs identified in the region / county / locality	For the purposes of this project proposal, the phrase "cyber security" integrates both the meaning given to it by GD no. 271/2013 for the approval of the Cyber Security Strategy of Romania, as well as the meaning given by Law no. 362/2018 on ensuring a high common level of security of networks and information systems, the phrase "security of networks and information systems". As the study "Project 2020 Scenarios for the Future of Cybercrime - White Paper for Decision Makers" (International Cyber Security Protection Alliance (ICSPA), European Cybercrime Center Europol, 2019) shows, at the simplest level the cyber threats analyzed can be divided into several important categories, namely:

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		• Intrusions for money or other benefits • Interception of communications for espionage purposes • Manipulation of information or data networks • Data destruction • Use of computing power for other purposes • Counterfeiting of goods • Fraud techniques and tools. The aim of the project proposal is, in the context of the continuous development of cyber threats to all market players, to significantly improve cyber security at the level of public and private legal entities that regulate, authorize, operate and protect naval and port infrastructures in the internal waters of Romania, by creating a Naval Fluvial Security Operation Center.
	The nature of state aid	Grants with non-reimbursable financing
	The main activities of the project	The implementation and provision of SOC services must be done in stages, starting from the identification of the services that will be provided, related to the actual needs of the participants in the target market. In this sense, the stages of implementation of the services must include services of: • Services specific to a security operation center (alerts on cyber threats, cyber security risk awareness campaigns, detection and protection against intrusions into computer systems, cyber security incident management, etc.) • Deepening the specialization of the partners' staff, who will be involved in the effective provision of services • Training and specialization for customer employees • Cyber security consulting and support for the target market • The services provided will be able to cover the field of personal data, a sensitive area both for the entire public administration and for all companies that manage data of users, subscribers, or simple site visitors. • Services for Essential Service Operators In the next stages of development of the SOC's activity, we propose to include other activities and services with high added value.
	Complementarity with other projects	As the field of cybersecurity is a dynamic field, in full evolution, far from reaching its technological limits in the foreseeable future, within the SOC there will be permanent activities of learning, research and development on prevention, identification and response to threats and cyber attacks in order to lead to the valorization of the results in the interest of the beneficiaries of its services. Thus, although currently the field of cyber security is quite developed in Romania, given the high level of market demand, the high general level of cyber security, data protection, computer systems and networks, as well as the high level of specialization of members We consider that the project proposal meets the requirements of the financier of innovation and provision of services in the fields of highly specialized, innovation / product development (goods and services), intelligent specialization and improvements in business processes, for to increase the economic competitiveness of the participants in the project implementation, but also the security and safety of customer data.
	Implementation period	
	Key achievements	
	Current stage of the project (evaluation of the maturity stage of the project)	
	Risks	Administrative risks, bureaucracy
8.	**Project title**	**Digitization of technical and communication parameters for powered ships.**

		Digital system for monitoring propelled ships in order to make inland water transport more efficient.
	Project applicant	CNFR NAVROM SA
	Contacts	1. Șerban Cucu – office@aaopf.ro - O 2. Ioan Bosoancă – diagnose.group@yahoo.com - E 3. Camelia Palagă – ccia@cciagl.ro - P 4. Veronica Gheorghița – programe@portal-brăila.ro - P 5. Sorina Păcuraru – sorina.pacuraru@ugal.ro - C
	Location of the project	Galați
	Project objectives	Lack of a real-time monitoring system for propelled vessels (information on the position of the vessel and information recorded by specific sensors on board the vessel). The need to reduce the fuel consumption of the propelled fleet in the context of Green Shipping - Energy, Emissions & Economy; according to the document issued in December 2019 by the European Commission - The European Green Deal, https://ec.europa.eu/. The need for a system method for the accurate determination of loaded goods.
	Project justification: needs identified in the region / county / locality	Lack of a real-time monitoring system for propelled vessels (information on the position of the vessel and information recorded by specific sensors on board the vessel). The need to reduce the fuel consumption of the propelled fleet in the context of Green Shipping - Energy, Emissions & Economy; according to the document issued in December 2019 by the European Commission - The European Green Deal, https://ec.europa.eu/. The need for a system method for the accurate determination of loaded goods.
	The nature of state aid	Grants with non-reimbursable financing
	The main activities of the project	• Analysis of critical points. • Modernization of the equipment on board the ship in order to integrate it in the monitoring system. • Development of the monitoring system. • Development of the monitoring web platform • Efficiency of inland waterway transport.
	Complementarity with other projects	
	Implementation period	36 months
	Key achievements	Identify the equipment on board the ship that needs to be upgraded for digitization. Acquisition and installation on board of ships of the necessary modern equipment. Integrated monitoring system. Functional platform for monitoring, processing, interpretation and graphical representation of transmitted data. Elaboration of analyzes and statistics of the monitored parameters. Pack of intelligent solutions to improve hydrodynamic performance, reduce fuel consumption, reduce emissions.
	Current stage of the project (evaluation of the maturity stage of the project)	TRL 2 - Formulation of the technological concept.
	Risks	Administrative risks, bureaucracy
9.	Project title	Electric Transport in the Danube Delta Biosphere Reserve Area - TEA RBDD
	Project applicant	Galați, Tulcea, Danube Delta Biosphere Reserve
	Contacts	cc.naoe@ugal.ro
	Location of the project	Galați, Tulcea, Danube Delta Biosphere Reserve

	Project objectives	General objective: Evaluation and proposal of motorization solutions based on electricity. Specific objectives: 1) Theoretical establishment and experimental validation of the mechanical energy consumption necessary for the propulsion of boats in the normal use regime, in the version with propulsion based on thermal engine; 2) Identification of charging cycles adapted to the mode of use, without altering the schedule and periods of travel and rest; 3) Energy needs assessment and energy storage options according to the identified cycles; 4) Launching technical proposals; 5) Building a functional prototype that can test the proposals submitted.
	Project justification: needs identified in the region / county / locality	Tourist transport boats use thermal engines for propulsion, contributing to the pollution of the Danube Delta Biosphere Reserve area.
	The nature of state aid	Grants with non-reimbursable financing
	The main activities of the project	1. Theoretical establishment of the propulsion energy requirement and experimental validation; 2. Identification of use cycles; 3. Launching alternative technical proposals based on previously assessed cycles and energy requirements; 4. Construction of a 1: 1 functional prototype for the project that meets the best score after consulting the previous point; 5. Technology transfer and dissemination
	Complementarity with other projects	Responsible Use of the Danube Delta Biosphere Reserve Area - URA RBDD
	Implementation period	36 months
	Key achievements	Identifying the need for propulsion energy; Establishing periods of rest, use and energy requirements of periods of use; Designing alternative solutions and consulting the DDBRA and the user cluster; Validation of the technical project; Presentation of results and transfer to industrial entities interested in marketing solutions.
	Current stage of the project (evaluation of the maturity stage of the project)	Flow studies around the hull of sliding boats (research projects, contracts with third parties, journals, international conferences). Erosion and sediment deposition studies in flowing riverbeds (doctoral theses, international conferences).
	Risks	Administrative risks, bureaucracy
10.	**Project title**	**Responsible Use of the Danube Delta Biosphere Reserve Area - URA RBDD**
	Project applicant	Naval Architecture Research Center (CCAN), University of the Lower Danube in Galati (UGAL)
	Contacts	cc.naoe@ugal.ro
	Location of the project	Galați, Tulcea, Danube Delta Biosphere Reserve
	Project objectives	General objective: Assessment of the degree of erosion due to the wave energy produced by various types of boats. Specific objectives: 1) Establishment of erosion mechanisms due to waves produced by boats; 2) Experimental validation of the identified theoretical models; 3) Establishing criteria for reducing erosion and communicating them in order to be implemented by the bodies authorized for the protection of the protected area.

	Project justification: needs identified in the region / county / locality	Erosion of the banks of the Danube Delta ecosystem following the intensive use of recreational craft on the secondary channels of the Danube Delta Biosphere Reserve (RBDD).
	The nature of state aid	Grants.
	The main activities of the project	1. Establishment of erosion mechanisms due to waves produced by boats; 2. Experimental validation of the identified theoretical models; 3. Establishing criteria for reducing erosions and communicating them in order to be implemented by the bodies authorized for the protection of the protected area; 4. Dissemination.
	Complementarity with other projects	Electric Transport in the Danube Delta Biosphere Reserve Area - TEA RBDD
	Implementation period	36 months
	Key achievements	Identifying the short and medium term effects on the banks of the watercourse; Acquisition of experimental data and their processing in order to validate and / or correct the identified theoretical models; Elaboration of solutions that minimize as much as possible the effects of washing the shore produced by the waves of boats; Scientific report and implementation recommendations.
	Current stage of the project (evaluation of the maturity stage of the project)	Flow studies around the hull of sliding boats, presented in articles at international conferences and results of research projects already carried out. Erosion and sediment deposition studies in flowing riverbeds, presented at various workshops, symposia and specialized international conferences.
	Risks	Administrative risks, bureaucracy
11.	**Project title**	**Intelligent solutions for the efficiency of naval transport-INO-Ship**
	Project applicant	Naval Architecture Research Center (CCAN), University of the Lower Danube in Galati (UGAL)
	Contacts	cc.naoe@ugal.ro
	Location of the project	Galați
	Project objectives	General objective: Evaluate and propose innovative solutions to streamline shipping and reduce emissions. Specific objectives: 1) Numerical hydrodynamic analysis in order to improve the propulsion performance for ships providing transport on the Danube. 2) Improving the energy efficiency of passenger ships on the Danube and in the Black Sea area Investigating the hydrodynamic problems faced by companies involved in shipping (infrastructure, design and operation) and providing technical solutions involving advanced studies in hydrodynamics to improve the performance of shipping and ship operations in the Danube-Danube Delta - Black Sea.
	Project justification: needs identified in the region / county / locality	Investigarea problemelor de hidrodinamică cu care se confruntă companiile implicate în transportul naval (infrastructură, proiectare și operare) și oferirea de soluții tehnice care implică studii avansate în hidrodinamică în vederea îmbunătățirii performanțelor transportului naval și operării navelor în zona Dunăre-Delta Dunării – Marea Neagră.
	The nature of state aid	Grants
	The main activities of the project	1. Identification of critical points of propelled vessels 2. Establishment of numerical investigation methods 3. Experimental validations 4. Validated, constructive and design intelligent solutions in order to make consumption more efficient and reduce pollutant emissions

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		5. Technology transfer and dissemination
	Complementarity with other projects	Electric Transport in the Danube Delta Biosphere Reserve Area - TEA RBDD Responsible Use of the Danube Delta Biosphere Reserve Area - URA RBDD
	Implementation period	24 months
	Key achievements	Defining the propulsion problem; Defining the package of advanced numerical methods and the necessary logistics. Defining the cases to be analyzed; Experimental validations in CCAN laboratories of the numerical solutions obtained; Final report on the results obtained and solutions for implementing the proposed measures; Presentation of results and transfer to companies operating on the Danube, Danube Delta, Black Sea.
	Current stage of the project (evaluation of the maturity stage of the project)	Numerical flow modeling studies around the hulls of ships in displacement and gliding, experimental and nature measurements, contracts, grants, national and international projects, consortia, dissemination in journals, workshops and specialized conferences.
	Risks	Administrative risks, bureaucracy
12.	**Project title**	**DELTALIFTER Innovative system for lifting and transporting disused metal structures offshore (marine decomissioning tool) and construction support for offshore wind farms**
	Project applicant	ICEPRONAV Engineering SRL, Galati, Romania/ Norwegian company Deltalifter Technologies AS si Universitatea Galati.
	Contacts	ICEPRONAV ENGINEERING SRL, gabi.onofrei@icepronav.ro; fax 0236417836
	Location of the project	Galati, South East Region, 19 Port Port Street
	Project objectives	The general objective of the project is to create a new, innovative product internationally, designed to collect disused marine structures offshore and bring them ashore. Also, the product that will be designed and tested on a large scale model will be able to service offshore wind farms, ensuring the transport by simple ecological means of windmill pillars and components, when installing and uninstalling them in offshore wind farms. The specific objectives aim at developing the technical, computational and experimental means specific to the project, the use of innovative software products specific to marine engineering
	Project justification: needs identified in the region / county / locality	The project aims to design and test a system for collecting and transporting to and from shore the structures of marine platforms (jackets) for oil exploitation and / or windmills installed offshore. The device, patented by the grant beneficiary, can serve both the decomissioning sector and, in a similar variant, the marine windmill construction industry, contributing through innovative methods and technologies to the growth of companies in the South East Region but also the expansion internationally of this method, requested by potential customers (eg Boksalis, Fred Olsen etc).
	The nature of state aid	Grants
	The main activities of the project	2.1 State aid for research and development: NO 2.2 Regional state aid: Yes, for: - Research-development-innovation activities in the field of naval hydrodynamics, and marine technology in order to ensure the stability and operational functionality of the device. - Numerical Simulations and CFD Analysis, - Activities that design the body of the device and related systems - Realization of an experimental model

		- Testing the model in conditions similar to the natural ones in the laboratories of the University of Lower DanubeGalati - Obtaining technical-economic approvals (Technical Feasibility Approval) - Realization of the execution plans of the device - Collaboration (technical assistance) with a shipyard (preferably in the South East Region) agreed by the client / clients identified in order to build the device. - Final tests, guarantees, etc 2.3 De minimis aid: YES, for activities associated with technology transfer
	Complementarity with other projects	No
	Implementation period	24 months
	Key achievements	Diversification of ICEPRONAV ENGINEERING services / production by developing a new range of services / products relevant to the fields of intelligent specialization specific to the South East Region to this guide, which adds to the assortment range already offered by the respective entity. -a new product and related consulting services.
	Current stage of the project (evaluation of the maturity stage of the project)	Started
	Risks	The technical and engineering risks are analyzed in the feasibility study. There are no significant risks either from a technical-economic or administrative point of view. The technical risks are minimal, as the project has a feasibility study with very good results, the innovation underlying the project is patented, and the concept also has the approval in principle of a Classification Company.
13.	**Project title**	**Innovative Concept Design of Multi-Sectoral Platform Vessel for Offshore Operations**
	Project applicant	ICEPRONAV Engineering SRL, Galati, Romania, un Santier naval din Regiunea Sud Est si Universitatea Dunarea de Jos, Galati.
	Contacts	ICEPRONAV ENGINEERING SRL, gabi.onofrei@icepronav.ro; 0751220682 fax 0236417836
	Location of the project	Galati, Regiunea Sud Est, Str Portului nr 19A
	Project objectives	The general objective of the project is to create a new, innovative product internationally, a versatile technological platform for the design and construction of Operation Support Vessel ships, with multiple applications in all European seas, including the Black Sea and the South East Region. The platform aims at a complete innovative methodology that allows the rapid adaptation of the range of dimensions but also the endowment with equipment for technical support ships that serve different types of operations at sea: offshore operations, installation of offshore wind farms, et. The product will be designed and tested on the model and will be built in one or more construction sites to which the technological transfer will be made. The product will be able to assist the servicing of offshore wind farms, ensuring the transport by simple ecological means of the pillars and components of windmills, at their installation and uninstallation in offshore wind farms. The specific objectives aim at developing the technical, computational and experimental means specific to the project, the use of innovative software products specific to marine engineering
	Project justification: needs identified in the region / county / locality	The project has several components: - The project meets the current market requirements, very strong in the seas of Northern Europe, where potential customers have been identified, aims to design and test a versatile technology platform of multi-sectoral type, contributing through

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		innovative methods and technologies to increase company development from the naval industry in the South East Region but also the international expansion of this method, requested by potential customers (for example Ferguson Marine, from the UK, etc.).
	The nature of state aid	Regional state aid
	The main activities of the project	2.1 State aid for research and development: NO 2.2 Regional state aid: Yes, for: - Research-development-innovation activities in the field of naval hydrodynamics, and marine technology in order to ensure the stability and operational functionality of the device. - Numerical Simulations and CFD Analysis, - Activities that design the body of the device and related systems - Realization of an experimental model - Testing the model in conditions similar to the natural ones in the laboratories of the University of Lower DanubeGalati - Obtaining technical-economic approvals (Technical Feasibility Approval) - Realization of the execution plans of the device - Collaboration (technical assistance) with a shipyard (preferably in the South East Region) agreed by the client / clients identified in order to build the device. - Final tests, guarantees, etc 2.3 De minimis aid: YES, for activities associated with technology transfer
	Complementarity with other projects	No
	Implementation period	24 months
	Key achievements	Diversification of ICEPRONAV ENGINEERING services / production by developing a new range of services / products relevant to the fields of intelligent specialization specific to the South East Region to this guide, which adds to the assortment range already offered by the respective entity. -a new product and related consulting services.
	Current stage of the project (evaluation of the maturity stage of the project)	Started
	Risks	The technical and engineering risks are analyzed in the feasibility study. There are no significant risks either from a technical-economic or administrative point of view. The technical risks are minimal, as the project has a feasibility study with very good results, and the concept also has the approval in principle of a Classification Company.

Portofoliul de proiecte – Domeniul Confecții		
1.	Project title	Digital skills in the field of textiles and clothing
	Project applicant	National Research and Development Institute for Textiles and Leather Bucharest
	Contacts	Olaru Sabina sabina.olaru@incdtp.ro
	Location of the project	Bucharest
	Project objectives	General objective: • Updating occupational standards by introducing digital skills.

		Specific objectives: • Identifying the needs, trends and models in the applications of skills and jobs (skills intelligence) for the clothing sector; • Improving the attractiveness, quality and relevance of training in the field of clothing; • Creating and updating profiles and qualifications, in order to become more visible and comparable, facilitating the mobility of qualified people; • Increasing the attractiveness of the clothing sector and identifying talents, while contributing to increasing the employment capacity of young people, an essential requirement for the pandemic period we are going through; • Strengthening the network collaboration, partnerships and the coherence of the education and professional training policy, between different institutions at regional and national level during the implementation and after the end of the project.
	Project justification: needs identified in the region / county / locality	The European Commission recently launched the new "Industrial Strategy for a Globally Competitive, Green and Digital Europe", which will help meet three key priorities: maintaining the global competitiveness of European industry and a level playing field, both at national level. as well as globally, making Europe a climate-neutral by 2050 and shaping Europe's digital future (EC, 2020). Anticipating skills needs and promoting cooperation between industry and education - vocational training are two objectives of the Skills Agenda for Europe. At the national level, the education and training system offers qualifications / standards in the field of garments, which are outdated (developed in 2000) and can not meet the needs and requirements of companies at present: fast reaction capacity, high quality standards of products, environmentally friendly solutions, digital skills, workplace learning methodologies for workers. In addition, the garment industry is facing a shortage of skilled / highly skilled labor. These challenges require human resources with new skills and qualifications (technical and transversal).
	The nature of state aid	Grants
	The main activities of the project	1. Defining profiles and qualifications by identifying and validating the digital skills needs of clothing companies; 2. Designing new professional profiles and qualifications - in accordance with the specific skills needs identified by companies; 3. Elaboration of new occupational standards based on projected profiles and qualifications; 4. Supporting and offering resources to trainers in the clothing sector, in order to allow them to provide the new profiles (re-designed) in accordance with the skills needs of the sector; 5. Dissemination of project results by organizing networking sessions and dissemination / multiplication events.
	Complementarity with other projects	Development of technical textiles made in the South-East Region.
	Implementation period	36 months
	Key achievements	Report on skills needs and good practices for the garment sector in the SE region; Profiles and qualifications for the clothing sector; New / updated occupational standards containing digital skills; Training package for trainers; Networking sessions, multiplication events.
	Current stage of the project (evaluation of the maturity stage of the project)	INCDTP was involved in developing the profile and qualification for the Clothing Technician in collaboration with CITEVE - Portugal and AITEX - Spain.
	Risks	Administrative risks, bureaucracy

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2.	Project title	Development of technical textiles made in the South-East Region
	Project applicant	Romanian Textile Concept Cluster
	Contacts	Minela Neneciu office@romanian-textile.ro
	Location of the project	Bucharest
	Project objectives	Main objective: Development of innovative technologies for the production of technical textiles with cross-sectoral applications Specific objectives: - Development of innovation research capacity according to the European Standard CEN / TS 16555-1 on the innovation management system of companies in the textile field in the region and increase the percentage allocated to innovation research activity through a record of all expenses for innovation research activity. Increasing the number of specific innovation services offered to companies in the cluster and increasing their own innovation capacity, by increasing the degree of (eco) - innovation of enterprises in the RTxC cluster - Diversifying the assortment of the production range by introducing new articles as a result of an innovation research activity carried out by the companies from the textile domain from the South-East Region - Increasing the competitiveness of technical textile products made in the region, by increasing the added value of products made by creating its own brand and reducing production in the lohn system - Development of an organizational culture that allows the promotion and support of innovation, at the regional level by implementing methods regarding personnel policy to avoid massive staff fluctuations - Increasing the capacity of innovative companies to connect and integrate in European and international chains and networks in the fields of profile
	Project justification: needs identified in the region / county / locality	The technical textiles sector, which has seen positive economic and employment trends in the EU, is an example of a "traditional sector" capable of "redefining its identity" according to a new business model, fully adapted to the needs of the new industrial revolution. (smarter, more inclusive and more sustainable). Technical textiles are stimulating factors in other industries, proposing and offering: - alternative materials: light, flexible, soft, (multi) functional, durable; - new technologies: flexible, continuous, versatile; - reliable, multifunctional, cost - effective functional components, parts of broader user - oriented systems and technological solutions. "Technical textiles are defined as fibers, textile materials and auxiliaries that meet technical criteria rather than aesthetic criteria, even if, for certain markets such as work protection equipment or sports equipment, both types of criteria are met." They are used in various fields: - Agrotech - agriculture, horticulture, fish farming, etc - Buildtech- constructions and buildings - Clothech- clothing and footwear accessories - Hometech- various household objects - Indutech - uses in the industrial environment - Medtech - hygiene and medicine - Mobiltech - automotive and transportation industry - Pachetech - packaging and wrapping - Geotech - geotextiles and civic engineering - Sportech - sports and recreation - Protech - personal protection - Mobtech - furniture industry

	The nature of state aid	Grant
	The main activities of the project	1. Auditing the innovation capacity for cluster members according to the "Integrated Cluster Services" methodology 2. Development of a database with information on research, development, innovation offers and requests of member companies in the cluster. 3. Providing support from the cluster on the management of intellectual property rights 4. Providing specialized mentoring / coaching services to companies in the cluster 5. Design and realization of multifunctional products 6. Laboratory experiments for multifunctional products Performance evaluation of multifunctional products performed by specific tests and trials of the laboratory. Analysis of technical solutions for multifunctional textile products 7. Dissemination of scientific and technical information on: new technologies, new technological processes, technological processing and control equipment necessary for the industry, but also on technical solutions on environmental protection. 8. Ensuring a qualified training in the field of innovation of the representatives of the SMEs in the sector.
	Complementarity with other projects	Digital skills in the field of textiles and clothing Development of smart textiles
	Implementation period	36 months
	Key achievements	Structured interview that will follow the main vectors of innovation at the level of companies (innovation culture, innovation strategy, innovation management, networking, new markets, etc.) according to international practice in the field (ZENIT, Steinbeiss, ImProve), the eco-innovation audit that aims to introduce the concept of eco-innovation at the level of companies and competence mapping - complex methodology that aims at discovering new directions of innovative development of the company, professional training in the field of knowledge transfer; Creating a portfolio of patents and licenses by organizing a SCHOLARSHIP of patents / ideas; The protection of intellectual property rights is of great importance, the essence, purpose and purpose of which is to protect the product of human intelligence and, at the same time, to guarantee the benefit of consumers to use this product; Textile prototypes examples: New processes for making thermoregulable textiles (protective clothing and for babies); Making multifunctional textiles based on silver; Composite textile structures (nanolayers) used against electromagnetic radiation; Making components of ecological environmental products that are easy to replace when you want customization or diversification; Composite structures made of textile waste used to replace parts in the furniture industry. Laboratory tests and property evaluation reports that should satisfy the end customer. Publication in journals and specialized sites of the results obtained. Ensuring the acquisition of the necessary skills through its own system of integration in the production process at all levels.
	Current stage of the project (evaluation of the maturity stage of the project)	a) A Strategy for intelligent specialization of the RTxC cluster has been elaborated b) Collaborations have been initiated and encouraged in joint research projects such as:

		• PNCDI Project 2 "ESD clothes made of yarns with double core knitted conductive core - Garm ESD" - Technical University Gh. Asachi "Iasi + INCDTP + TANEX + other partners • Eureka project "Multifunctional textile materials with a role of protection against ticks - Tickotex" - INCDTP + Conflux + other partners
	Risks	Administrative risks, bureaucracy
3.	**Project title**	**Development of smart textiles**
	Project applicant	Romanian Textile Concept Cluster
	Contacts	Minela Neneciu office@romanian-textile.ro
	Location of the project	Bucharest
	Project objectives	General objective: Development of innovative technologies for making smart textiles, by incorporating sensors with different functionalities. Specific objectives: -Increasing the innovative capacity of companies in the field of textile garments in the South-East Region by developing advanced methods, tools and technologies resulting from research in order to develop intelligent textile products; -Development of products with which to enter niche markets; a viable solution for the future would be to enter markets where there is demand but less supply (competition in the fashion market becoming more and more fierce) - Increasing the capacity of companies in the field of textiles to connect and integrate in European and international chains and networks in different fields (IT, health, furniture industry, etc.).
	Project justification: needs identified in the region / county / locality	Intelligent textiles are the result of an interdisciplinary effort between science and technology and have been obtained by combining knowledge in mathematics, chemistry, physics, IT, and those in textile, electrical and mechanical technologies. And if not long ago, smart textiles were considered the mere imagination of scientists, now cyber fashion is a reality. The textiles of the future will improve our daily lives and open new possibilities for industry, health and the environment. We believe that the textile industry is moving from being suppliers of fabrics to becoming a positive force in social development.
	The nature of state aid	
	The main activities of the project	1. Auditing the innovation capacity for cluster members according to the "Integrated Cluster Services" methodology 2. Providing support from the cluster on the management of intellectual property rights. 3. Design and realization of multifunctional products 4. Laboratory experiments for multifunctional products Performance evaluation of multifunctional products performed through specific tests and trials of the laboratory. Analysis of technical solutions for multifunctional textile products 5. Dissemination of scientific and technical information about: new technologies, new technological processes, technological processing and control equipment necessary for the industry, but also about technical solutions regarding environmental protection. 6. Ensuring a qualified training in the field of innovation of the representatives of the SMEs in the sector.
	Complementarity with other projects	Development of technical textiles made in the South-East Region
	Implementation period	36 months

	Key achievements	Structured interview that will follow the main vectors of innovation at the level of companies. The protection of intellectual property rights is of great importance, its essence, purpose and purpose being to protect the product of human intelligence and, at the same time, guarantee the benefit of consumers to use this product. Design and production of prototypes produced by smart clothing. Development of innovative technologies for making smart knitted textiles, by incorporating sensors with different functionalities. Development of smart clothing products created for health Development of smart clothing products for children designed to protect and prevent accidents. Laboratory tests and property evaluation reports that should satisfy the end customer. Publication in journals and specialized sites of the results obtained. Ensuring the acquisition of the necessary skills through its own system of integration in the production process at all levels.
	Current stage of the project (evaluation of the maturity stage of the project)	-
	Risks	Administrative risks, bureaucracy
4.	**Project title**	**Recovery of textile waste resulting from the production process through innovative processing techniques / methods**
	Project applicant	Romanian Textile Concept Cluster
	Contacts	Minela Neneciu office@romanian-textile.ro
	Location of the project	Bucharest
	Project objectives	General objective: Full recovery of textile waste resulting from the production process in the context of the concept of circular economy. The specific objectives of this project are based on the concept of 4R = REDUCE, REUSE, RECYCLE and RETHINK in the textile and clothing sector and involve convergent activities with implications for economic, research and training activities: -Changing the proportionality relationship between economic growth and the generation of textile waste resulting from production processes; -Developing the innovation capacity of textile companies in the South-East Region by applying the results of multidisciplinary research in the field of recovery through "hybrid technologies" of waste resulting from the production process of textiles (resulting in minimization, reduction, recovery, recovery of waste textiles) -Establishing and applying models for integrated waste management, through combined efforts of production and trade companies, local authorities, civil society, but also of citizens in compliance with the general principles, in particular the "polluter pays" principles and the one on "producer responsibility". - Organization of a Regional Storage and Sorting Center for Textile Waste. - Continuing vocational training and / or the development of skills for staff involved in the circular economy, the development of skills that take into account current and future impacts, social, cultural, economic and environmental. -Developing the tools, interconnected, that we need to succeed in achieving the objectives of sustainable development: * permanent access to the results of RDI activities and participation in multidisciplinary research teams of excellence; * online multiparty platforms;

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		* organizing information and awareness programs, with the involvement of all stakeholders, on nature protection (biunivocal human-environmental impact).
	Project justification: needs identified in the region / county / locality	The circular economy is based on the phrase "produce-consume-reuse" and proposes a new way of rethinking the use of resources, so as not to affect the environment. This establishes a credible and ambitious path for better waste management in Europe, through support actions that cover the entire product life cycle. This combination of smart regulation and EU-wide incentives will help businesses and consumers, as well as national and local authorities, to bring about this transformation. Many SMEs in the South-East Region do not have the technical capacity to identify, assess and implement more advanced technical options that will allow them to reduce their impact on the environment through a sustainable recovery of their waste from production, giving priority technologies they are already familiar with. There is a great opportunity to implement an innovative business model by organizing a Regional Textile Waste Storage and Sorting Center that will take over and capitalize on textile waste resulting from production both regionally and even nationally.
	The nature of state aid	Grants
	The main activities of the project	1. Research and monitoring activities. a. Monitoring of textile waste at national level by quantities, compositions, etc. b. Analysis of existing technologies for textile waste recycling. c. Quantitative and qualitative analysis of the resulting waste. d. The choice of recovery methods depending on the quantity and quality of waste. 2. Elaboration of a feasibility study on the opportunity to create a Center for storage and regional sorting of textile waste. 3. Investment in the creation of a Regional Storage and Sorting Center for Textile Waste. 4. Elaboration of a Feasibility and Impact Study in order to implement the new adopted technology. 5. Studying and choosing the optimal technological variants regarding the recovery of textile waste. Investment in the initiation and development of a new technological line that will use as raw material the textile waste purchased and sorted in the specially created Center. 6. Organizing training courses in Ecoinovare, Circular Economy, etc. for both cluster members and others. 7. Creation of an online platform on waste management. 8. Initiate the elaboration of a "Practical guide on integrated textile waste management".
	Complementarity with other projects	Digital skills in the field of textiles and clothing
	Implementation period	36 months
	Key achievements	Development of technology for the recovery of textile waste to the finished product. Testing and validation of the proposed technology. Recommendation of areas of use depending on the quality of the waste and the requirements of the finished product. Feasibility study on the opportunity to create a regional textile waste storage and sorting center. Center for storage, sorting and use of textile waste according to the new technologies adopted. Increasing the level of innovation and competitiveness in the textile industry and developing a value chain from conception to recovery of textile waste. Increasing the level of regional textile business.

		Innovative product with application in multisectoral fields. The contribution of the textile industry to the intersectoral development of the regional circular economy. Formation of a regional team specialized in the circular economy in the textile field. Communication tool between cluster members with free registration and for those who are not members you can charge a fee, the platform to provide clear selection criteria, a database, etc. Final deliverable of the project.
	Current stage of the project (evaluation of the maturity stage of the project)	At the request of the RTxC cluster in 2019, it was elaborated by INCDTP - Direct contract no. 8/2019 STUDY REGARDING TEXTILE WASTE RESULTING FROM THE TEXTILE - GARMENTS SECTOR. This study was based on the competence, experience and research activity carried out by the institute's specialists in the field and the results obtained through monitoring tools and information from the specialized literature.
	Risks	Administrative risks, bureaucracy
5.	**Project title**	**Development of advanced technologies for innovative clothing**
	Project applicant	Romanian Textile Concept Cluster
	Contacts	Minela Neneciu office@romanian-textile.ro
	Location of the project	Bucharest
	Project objectives	General objective: Increasing the innovation capacity of SMEs which will become one of the particular features of this sector, along with flexibility and market orientation. The success of the innovative activities carried out by SMEs will materialize both in the development of markets by introducing new or improved products, and by improving and innovating in the field of organizational and technological processes specific to each company, including distribution processes. Specific objectives: -Increasing the innovative capacity of companies in the field of textile garments in the South-East Region by developing advanced methods, tools and technologies resulting from research in order to develop innovative clothing products. -Development of products with a higher added value, which can be achieved by offering services of higher quality or greater complexity, creating their own collections through which to better promote their creative and production capabilities by offering complete products, possibly by using the supplier base offered by the cluster. -Development of products with which to enter niche markets, a viable solution for the future would be to enter markets where there is demand but fewer offers (competition in the fashion market becoming increasingly fierce): the development of customized products by using made-to-measure technologies; development of products with special properties and characteristics (for maintaining well-being and health, for health monitoring, etc.); development of special purpose products (health, army, protection, sports, etc.); these products can be realized by using innovative technologies and advanced materials (without necessarily needing a refurbishment) offered by the national and international RDI entities with which the cluster has collaborations. -Developing an organizational culture that allows the promotion and support of innovation, at the regional level by implementing methods regarding personnel policy to avoid massive staff fluctuations.
	Project justification: needs identified in the region / county / locality	In the intelligent development of the textile and clothing industry in the South-East Region and beyond, a strategic reorientation must be considered by shifting the focus from production based on high volume and low added value, to production

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		based on innovation and in at the same time to stimulate the development of design and design activities and the use of new textile materials. The strong tradition and knowledge gained in the field, as well as the high quality of the products are the strengths of the regional textile industry, these strengths can be doubled by a much better use of creative resources and untapped potential in this field..
	The nature of state aid	Grants
	The main activities of the project	1. Audit of innovation capacity for cluster members according to the "Integrated Cluster Services" methodology. 2. National Standard Size Analysis of textile products (replacement of the one made in 1973). 3. Product design and production. 4. Laboratory experiments for multifunctional products. Performance evaluation of multifunctional products performed through specific tests and laboratory tests. 5. Dissemination of scientific and technical information about: new technologies, new technological processes, technological processing and control equipment necessary for the industry, but also about technical solutions regarding environmental protection. 6. Ensuring qualified training in the field of innovation of representatives of SMEs in the sector.
	Complementarity with other projects	-
	Implementation period	18 months
	Key achievements	Structured interview that will follow the main vectors of innovation at company level (innovation culture, innovation strategy, innovation management, networking, new markets, etc.) according to international practice in the field (ZENIT, Steinbeiss, ImProve), the eco-innovation audit following the introduction the concept of eco-innovation at the level of companies and competence mapping - complex methodology that follows the discovery of new directions of innovative development of the company, professional training in the field of knowledge transfer. Updated standard. Textile prototypes, examples: • Making Made to Measure (custom) clothing using IT techniques. • Innovative solutions for capitalizing on the Romanian traditional elements in the fashion lines and creating a brand. • Making garments from 100% natural fibers finished by various ecological processes in order to create an ECO collection. • Implementation of new knitting methods in order to achieve specific products to improve health. • A new clothing - CAD for 2d / 3D geometric modeling of garments. Laboratory tests and property evaluation reports that should satisfy the end customer. Publication of the results obtained in journals and specialized sites. Ensuring the acquisition of the necessary skills through its own system of integration in the production process at all levels.
	Current stage of the project (evaluation of the maturity stage of the project)	An Intelligent Specialization Strategy of the RTxC cluster has been developed Collaborations have been initiated and encouraged in joint research projects, such as: -Eureka project "A new paradigm of processes and services for clothing for obese and elderly people - GarmNet" - initiated by Datsa and INCDTP in collaboration with companies from other countries.

		-The project "National anthropometric standard for children" carried out by INCDTP in collaboration with the RTxC cluster (Foundation and Lauder / Reut Educational Complex member of the cluster).
	Risks	Administrative risks, bureaucracy
6.	**Project title**	**Integration of digitalization of flows, acquisitions of consulting programs**
	Project applicant	SC Simiz fashion SRL
	Contacts	office@simizfashion.ro / lidia.herescu@simizfashion.ro
	Location of the project	Vrancea
	Project objectives	Project objectives: • Linking the product development stages with the production process so as to save time and have consistent information in the production process. • Linking the printing processing to the elaboration of the technical documentation (the printing software to generate a technical file). • Attaching the information from the development area (sewing) produced to the technical documentation that goes into production. • Elaboration of the technological process from the product development phase (sewing) correlated with the type of equipment existing in the factory. • Recording the actual sewing and parking times, their integration in the production monitoring program and the equipment maintenance program. • Integrated quality system - to follow all stages of production and provide traceability and transparency. Too much share of wages in relation to turnover, customer pressure to lower prices, lack of vision for the future. An integrated program that aims at efficient production scheduling, preparation and implementation by following the parameters related to the efficiency of each job, leading to increased income of workers and stabilization of the workforce. Each machine should have an integrated activity tracking device and eliminate downtime and timely intervention of supervisors. Gathering information about production performance in real time in order to act and correct any deviations. Motivating those who perform through this more closely monitoring of performance. Connecting the production system with the quality one.
	Project justification: needs identified in the region / county / locality	Ponderea prea mare a salariilor raportată la cifra de afaceri, presiunea clienților de a scădea prețurile, lipsa unei viziuni asupra viitorului. Un program integrat care să urmărească programarea eficientă a producției, pregatirea și realizarea ei prin urmarirea parametrilor care țin de eficiența fiecarui loc de muncă, care să ducă la creșterea veniturilor muncitorilor și la stabilizarea forței de muncă. Fiecare utilaj să aibă integrat un dispozitiv de urmărire activitate și să se elimine timpii morți și intervenția supervizorilor în timp util. Culegerea informațiilor despre performanța din producție în timp real pentru a putea acționa și corecta eventualele abateri. Motivarea celor performanți prin această urmarire mai atentă a performanțelor. Conectarea sistemului de producție cu cel de calitate.
	The nature of state aid	Grants
	The main activities of the project	Product design Quality system improvement Tracking of working and parking times

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	Complementarity with other projects	Digital skills in the field of textiles and clothing
	Implementation period	36 months
	Key achievements	Efficiency in introducing the product on the manufacturing line. Process control and analysis to reduce the number of defects, so better yield and reward deserving operators. Control and analysis for a better organization of the line, efficient increase, decrease of costs, increase of reward to efficient operators.
	Current stage of the project (evaluation of the maturity stage of the project)	There is nothing in the field in this regard. At the moment, there is a global price war, based on less labor in Asian countries. We cannot cope with this trend. If we still want to have tailors in Europe, we need to bring industry to the level of the 21st century. Now we are working with the mentality and endowment of the 20th century, in which cheap labor made a difference. We can't go on like this. It is time to give this industry a chance in Europe, and to find partners to help it shine again. Let's find the motivation of young people to come to this industry through special working conditions, through an attractive salary and interesting challenges.
	Risks	Administrative risks, bureaucracy

Aquaculture and fisheries domain		
1.	Title of the project	"National Research Centre for Biology, Conservation, Artificial Reproduction and Harvesting of living aquatic resources" — BIOACVATEH
	Project Proposant	Development Research Institute for Aquatic Ecology, Fisheries and Aquaculture Galați — ICDEAPA Galati
	Contact details	icdapa@artelecom.net; icdeapa@icdeapa.ro
	Location of the project	Galati
	Objectives of the project	The project is intended to increase the research capacity of ICDEAPA by organising a research centre for aquatic living resources. The Centre will be organised as pilot laboratories and technology lines with the following functions: Laboratory of ihtiology and ecobiology of living aquatic resources Laboratory for Engineering in Aquaculture and Fisheries Aquatic Ecology Laboratory Laboratory for processing, quality and safety of aquaculture and fisheries products Technology line for post-embryonic development Intensive rearing technological line, recirculating Technological line for artificial reproduction of living aquatic resources
	Project justification: needs identified in the region/county/municipality	The R & D capacity development project is initiated and supported by favourable developments in the economic environment of the proposant, as well as in the national R & D environment stimulated by the EU Partnership. Romania's fishing heritage is made up of areas permanently or temporarily covered with water, with a stretch of almost 500.000 ha of stagnated waters, 66 000 km of rivers in the mountain, hilly and snow rivers and 25.000 km² of marine waters of the Black Sea Zone. The total area of inland waters in Romania is 730.000 ha, representing approximately 3 % of the total area of the country. There are 100.000 ha of fish facilities (ponds and lakes) and 99.000 ha of deposit lakes organised as fish farms. Fish production comes from aquaculture, inland natural fishing and marine fishing. The total fish production in Romania in the period 1985-1989 fluctuated around 250.000 tonnes, with a maximum of 271.126 tonnes in 1986. Since 1990, total fish

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production has fallen by half, i.e. 127.659 tonnes, a sharp drop in recent years, bringing it to 19.599 tonnes in 1997.

In 1998 aquaculture accounted for more than 55 % of total production (11,2 thousand tonnes), inland fishing by about 23 % (4,6 thousand tonnes) and sea fishing with a further 20 percent (3,9 thousand tonnes). In 2002 the catch in natural waters and aquaculture production amounted to 16.237 tonnes and in 2003 it had a total value of 13.727 tonnes.

The decline in fish production in Romania was the result of the economic crisis specific to the transition to a market economy, characterised by low investment in the sector, both in terms of production and in capital investments, over exploitation through irrational fishing in natural waters, pollution of the aquatic environment, destruction of habitats, lack of stocking material, etc.

According to the Food and Agriculture Organisation of the United Nations (FAO), aquaculture is one of the food production sectors with the highest growth rate and which currently accounts for 50 % of the world's fish consumption. The European Union (EU) produces around 2 % of aquaculture fish globally, but it is a world leader in terms of quality and sustainability.

In Europe, aquaculture directly employs around 85.000 people; they provide high quality products that meet high sustainability and consumer protection standards. However, production at EU level has remained constant since 2000, although overall it has increased by around 7 % per year. The increase in EU aquaculture production takes into account the optimisation, endowment and creation of new aquaculture technologies as well as the production of aquatic products with safe food and high quality. In this respect, there is an increase in the finish of intensive research in central and western European countries. In the present, aquaculture is used in Romania on 300 fish farms, 95 % of which apply fish farming technologies and 5 % harvest other aquatic organisms (mussels, crayfish, frogs, etc.). The fish production capacity of many farms is largely based on the natural productivity of fish basins ranging from 100-300 kg/ha.

Trends in aquaculture are aimed at:t he development of intensive aquaculture, the deployment of new fish and other aquatic living technologies in systems, the introduction of species of high economic value, the establishment of family fish farms to valorise the land on which they are located and the promotion of fish-tourism activities; increasing production to meet the needs of the market, promoting the training of fisheries personnel.

In the field of fisheries, the aim shall be to: balance and responsibly exploit living aquatic resources in natural basins, foster sustainable development and the adoption of measures necessary to protect, conserve and regenerate these resources and aquatic ecosystems, endowment of the coastal fishing fleet and implementing the mechanism for statistical reporting of catches and landings of fish and other living aquatic resources, building fisheries ports and fish landing points.

From the current situation of the sector at national level, it can be seen that the project proposal is formulated on the basis of objective considerations arising from the priorities of socio-economic activity in fisheries and aquaculture and that this project can cover an extremely wide range of services in both the public and private spheres. The results of the recovery activity in recent years highlight the poor state of living aquatic resources and the tendency to reduce them while maintaining the current exploitation regime. This situation, like the trend towards a reduction in natural productive capacity, calls for the development and subsequent implementation of a programme in which the principle of sustainable use of all natural resources is a priority and the development of aquaculture, as an alternative, supports it.

		The rationale for this strategic programme can only be done on the basis of scientific studies and research to assess stocks, characterise the ecological factors that define the diversity of the aquatic ecosystem, its bioproductive potential, support capacity, and research into the development of artificial reproduction and growth systems and technologies that enable the development of cost-effective aquaculture as an alternative conservation measure.
		The two strands of research that can make a defining contribution to the development of the fisheries and aquaculture sector with sustainable exploitation of all living aquatic resources require competitive utilities and material assets to increase the quality and efficiency of research.
		The promotion of this project "National Research Centre for Biology, Conservation, Artificial Reproduction and Harvesting of living aquatic resources" will directly contribute to the development of high-performance research, technological development and trainnig infrastructure in the field of conservation, ecobiology, reproduction and growth technologies of living aquatic resources in Romania's natural river basins and in transboundary areas. This will be a science pole providing performance services to underpin the most appropriate strategies to exploit the bioproductive potential of aquatic ecosystems and develop aquaculture activity.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Activities for the implementation of the infrastructure:
		The technical documentation for upgrading the technology lines and the related laboratories, i.e. the technical upgrade project, will be carried out in partnership between the institution receiving the investment and the design institution to be designated following the procurement procedure for design services and technical assistance.
		The beneficiary of the investment will draw up the design theme specifying the specific technological requirements and equipment on each specialised technology line and laboratory.
		The designer shall, on the basis of the technology requirement issued, draw up and submit for opinion studies on the solutions for upgrading and securing utilities. The best solution after which the designer will draw up the technical implementation documentation will be approved by mutual agreement.
		Acceptance of the project shall be the responsibility of the beneficiary.
		Endowment of technology lines and laboratories serving them
		The activity itself initially involves the purchase of works execution services. The preparation of documentation and the procurement procedure for execution services shall be the responsibility of the beneficiary who will comply with the legislation on the procurement of services and reception at physical and value stages.
		The builder, the winner of the tender, shall take from the general project estimate the part of the construction works and the installation of machinery, and the beneficiary shall provide the builder with the equipment and equipment fitted.
		Acceptance of the endowment works shall be carried out in part, preliminary, final and final in accordance with the timetable for the phasing of the works. Receptions shall be the responsibility of a committee appointed by the beneficiary of the investment.
		Preparation of procurement documentation and acquisition of research equipment
		Activities to strengthen administrative capacity:
		The beneficiary of the investment will receive advice to improve institutional management, capitalising of research results, access to financial instruments. The consultancy services will be purchased by the beneficiary of the investment following the application of the procurement procedure.

	Complementarity with other projects	The project fits into the Lisbon Strategy, developed in 2000, which aimed to make the European Union the most competitive economic entity in the world by 2010 at the heart of the "knowledge triangle" — research, education and innovation — which will enable the development of European poles of scientific excellence. With regard to the international situation, Romania being a signatory to the Convention on Biological Diversity (Rio de Janeiro, 1992) and acceding to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979), has implicitly committed itself to taking action to protect the national natural genofone, whose components of great value are also the Danube sturgeon species. Since 2004 the Fisheries Management Authorities of the countries of N-V Black Sea and Lower Danube and CITES have agreed on a Regional Strategy for the Sustainable Conservation and Management of Sturgeon Populations in N-V Black Sea and Lower Danube in accordance with the provisions of the CITES Scientific Authority. The Regional Conservation Strategy provides as priority actions in the short term to obtain information on the current biology of sturgeon populations, to carry out molecular genetic studies, to develop artificial reproduction and growth technologies to ensure supportive stocking, and to develop a stock assessment system. In view of the provisions set out in the strategy, endorsed by the Romanian Fisheries Management Authority, Romania needs to provide the infrastructure necessary for the implementation of priority actions, which is currently not in place.
	Duration of the project	36 months
	Key outputs	The project proposal aims at developing a high-performance infrastructure for research, technological development and training in the field of conservation, ecobiology, reproduction and growth technologies of living aquatic resources in natural river basins. The project promoter proposes the creation of a National Research Centre for Biology, Conservation, Artificial Reproduction and Culture of living aquatic resources, a strong scientific pole where the intellectual potential of an academic scientific structure will be reconciled with its infrastructure by compensating for each other and contributing to the development of the knowledge heritage in the area of living aquatic resources, fisheries and aquaculture. By developing the infrastructure of this scientific pole it will become the generator of scientifically sound information for the central public authority structures managing and managing living aquatic resources, contribute to the recovery and conservation of declining wild stocks through the stocking of biological material through artificial reproduction, provide stable and robust support for the development of fisheries and aquaculture through new, cost-effective activities, and develop scientific works recognised and valued by international fora. At the same time, the project is expected to provide the opportunity for particular performance in the training of young researchers and staff working in the private sector in the fisheries and aquaculture sector. Last but not least, the development of high-performance infrastructure and the creation of a strong science pole aim at strengthening Romania's position as a member of the Danube Convention and as a signatory to the Convention on Biological Diversity (Rio de Janeiro, 1992) and the Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979).
	Status of the project	—
	Risks	Administrative risks, bureaucracy
2.	**Title of the project**	**Strategy for the conservation of fishery resources in the DDBR**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Aurel Năstase — aurel.nastase@ddi.ro

	Location of the project	Tulcea
	Objectives of the project	The current state of fish resources in the DDBR. Identification of commercial species of conservation interest. Stock recovery measures. Sustainable management.
	Project justification: needs identified in the region/county/municipality	Conservation of natural aquatic fishery resources in the DDBR by increasing the recovery of commercial fish stocks through the implementation of sustainable exploitation management.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Preparation of the Action/Measures Plan for the conservation of the fishery resource in the area. Identify problems by comparing current status with objectives. Definition of objectives for the conservation and sustainable recovery of the fishery resource. Economic activities with an impact on the aquatic environment.
	Complementarity with other projects	"National Research Centre for Biology, Conservation, Artificial Reproduction and Culture of living aquatic resources" — BIOACVATEH
	Duration of the project	48 months
	Key outputs	Analysis of documentation on the current state of fish resources in the DDBR. Practical measures for the recovery of commercial fisheries resources. Reports on sustainable management of commercial fish species in the DDBR.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
3.	**Title of the project**	**Integrated Monitoring System — Implementation and Maintenance of Equipment Tracking and AVU for On-Site System Information — SIMDD**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Cristian Trifanov — cristian.trifanov@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Ensuring and using the high resolution cartographic products necessary to monitor strictly protected sites and the morphodynamic evolution of the relief elements of the R.B.D.D.; Developing the processing capacity of high-resolution primary mapping data; Provision of a multidisciplinary UAV monitoring and intervention platform.
	Project justification: needs identified in the region/county/municipality	The development of research and innovation capacities and the adoption of advanced technologies of UAV systems in order to map habitats and species.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Establishment of a UAV platform to map and monitor habitats and species as well as to respond to emergencies. 2.Development of the capacity to collect data from the field. 3.Development of data processing and analysis capacity. 4.Concatenation of the UAV platform to the emergency system to assist and evaluate events.
	Complementarity with other projects	Strategy for the conservation of fisheries resources in the DDBR
	Duration of the project	24 months
	Key outputs	1.Update of the elevation model of the territory of the DDBR. 2.Improvement of the maps of potential habitats for species assessed under the DDBR Management Plan.
	Status of the project	INCDDD has experience of field data collection using consumer AVU systems. It also possesses advanced knowledge of data processing and analysis from the perspective

		of the 'Information System and Geomatic' department with licensed and opensource applications to develop GIS analyses as a digital and decision-making support for the departments of the institution.
	Risks	Administrative risks, bureaucracy
4.	Title of the project	**Assessment of ecosystem services in the context of continuous modelling of the natural framework and biodiversity specific to the Danube Delta Biosphere Reserve**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Gabriel Lupu — gabriel.lupu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Organisation and development of a centre/focus-group of scientific expertise to assess and map ecosystem services at regional level. Develop a portfolio of well-performing R & D & I services to strengthen and develop local communities. Develop and develop a useful tool for aligning NATURA 2000 concepts with the needs of local communities by integrating R & D & I services on ecosystem services into management plans of protected natural areas
	Project justification: needs identified in the region/county/municipality	Strengthening civil society in rural areas by making its participation in regional development more effective, in a spirit of sustainable development based on ecosystem services; Strengthening the rules on the protection of ecosystems through mapping processes and the assessment of Ecosystems and their Services, in the context of the dynamics of the natural environment and biodiversity specific to the Danube Delta Biosphere Reserve
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Centralising data and determining how to apply the MAES (Mapping and Assessment of Ecosystems and their Services) methodology to wetlands according to regional — local specificities. Research on sub-areas of the South East Bioeconomy: Agro-food, Bioenergy, Biotechnologies, Mathematical Data Matching Modelling, Biodiversity, Monitoring the cross-border spread of invasive alien species and highly pathogenic micro-organisms with potential for mass spread. Mapping and estimating ecosystems and ecosystem services in the Danube Delta Biosphere Reserve
	Complementarity with other projects	Strategy for the conservation of fisheries resources in the DDBR
	Duration of the project	48 months
	Key outputs	R & D facilities at European level to enable national/international collaboration in the field of Bioeconomy. Contributions to the Integrated Indigenous Natural Bioresources Research Platform. Technological development together and for the region's economic environment.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
5.	Title of the project	**Ecological reconstruction work for Lake Fortuna from the Şontea-Fortuna aquatic complex**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Paula PINDIC, Ciprian ANORE, Alexandru BĂNESCU paula.pindic@ddni.ro, ciprian.anore@ddni.ro, alexandru.banescu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Works to prevent the sealing of canals, mats and lakes in the Şontea-Fortuna aquatic complex.

		Restoring the functions of natural ecosystems.
	Project justification: needs identified in the region/county/municipality	• Establishment and implementation of a special management regime for the conservation and protection of genopathy and species of flora and fauna • Improving water circulation in the water complex HEADING — FORTUNA • The return to the biological circuit of Lake Fortuna ecosystems of a surface of 71.2 ha that is now colluded with sedimentary deposits from the Old- Danube —via the Cranjala canal.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Topographical studies. 2.Geotechnical studies. 3.Hydrological analyses. 4.Works for the alluvial clearing of the lake (baking and picking of the site, mowing the aquatic vegetation, submerse and floating, clearing the sprouts, carrying out dykes, performing excavations — clearing, digging and scattering of earthworks, finishing of platform surfaces — replenished storage by mechanical work).
	Complementarity with other projects	Ecological reconstruction work for Lake Sitlina, from the Gorgova-Plant Aquatic Complex
	Duration of the project	36 months
	Key outputs	1.Restoring and increasing the bioproductive potential of the Danube Delta natural aquatic habitats and ecosystems. 2.To correct and improve the operating conditions of living areas, food and native living species.
	Status of the project	—
	Risks	
6.	**Title of the project**	**Ecological reconstruction work for Lake Sitlina, from the Gorgova-Plant Aquatic Complex**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Paula PINDIC, Ciprian ANORE, Alexandru BĂNESCU paula.pindic@ddni.ro, ciprian.anore@ddni.ro, alexandru.banescu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Works to prevent the collapse of canals, glazes and lakes in the Gorgova-furthermore aquatic complex. Restoring the functions of natural ecosystems.
	Project justification: needs identified in the region/county/municipality	• Establishment and implementation of a special management regime for the conservation and protection of genopathy and species of flora and fauna. • Improvement of water circulation in the Aquatic Complex Gorgova — Sparlina. • The return to the biological circuit of the ecosystems specific to Lake Plant of a surface of 33.6 ha that is now colluded with sedimentary deposits from the Sf arm.Gheorghe via the Centrlina Canal.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Topographical studies. 2.Geotechnical studies. 3.Hydrological analyses. 4.Works for the alluvial clearing of the lake (baking and picking of the site, mowing the aquatic vegetation, submerse and floating, clearing the sprouts, carrying out dykes, performing excavations —clearing, digging and scattering of earthworks, finishing of platform surfaces — replenished storage by mechanical work).
	Complementarity with other projects	Ecological reconstruction work for Lake Fortuna from the Șontea-Fortuna aquatic complex
	Duration of the project	36 months

	Key outputs	1.Restoring and increasing the bioproductive potential of the Danube Delta natural aquatic habitats and ecosystems. 2.To correct and improve the operating conditions of living areas, food and native living species.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
7.	**Title of the project**	**Identifying seasonal changes in aquatic fauna using eDNA as a tool to monitor biodiversity in the Danube Delta**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Daniela Nicoleta Holostenco — daniela.holostenco@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Evaluation of aquatic fauna in the Danube Delta using eDNA as a biodiversity monitoring tool. Identification of the distribution of rare, relict or endemic species in the Danube Delta by eDNA technique. Identification of the distribution of invasive species in the Danube Delta by eDNA technique.
	Project justification: needs identified in the region/county/municipality	This project aims to use advanced technologies to provide a complex picture of the dynamics of seasonal changes in aquatic fauna in the context of climate change.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Development of the optimal water sampling plan in the Danube Delta aquatic ecosystems for the analysis of aquatic fauna by the eDNA method 2.Sampling of water for the quantification of aquatic fauna by the eDNA method. 3.Assessment of the seasonal dynamics of aquatic fauna in the Danube Delta by the eDNA method
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	Composition of aquatic fauna quantified by the eDNA method. Distribution of rare, relict or endemic species and invasive species in the Danube Delta through the eDNA technique. Dynamics of seasonal changes in fauna in the Danube Delta.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
8.	**Title of the project**	**Evaluation of the success of actions to populate the Danube with sturgeon**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Marian Paraschiv — marian.paraschiv@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Assess the effectiveness of Danube breeding programmes. Assessment of the current status of sturgeon populations in the Lower Danube. Assessment of the impact of anthropogenic pressures on sturgeon species
	Project justification: needs identified in the region/county/municipality	The project aims at assessing the status of the Danube sturgeon population; assess the results of the measures implemented since 2006 (effectiveness of the PPSD, assess the contribution of the measures taken to restore the conservation status) and establish the necessary measures to be taken by the MM to protect sturgeon species as well as the impact of anthropogenic pressures on sturgeon species.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Estimating the effectiveness of results achieved at national and regional level in populating the Danube with juveniles of sturgeon species for stock regeneration.

		Study on sturgeon migration and identification of breeding, feeding and wintering habitats in the DDBR.
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	Determining the degree of efficiency of the breeding programme. Data collection component. Information and Awareness Web Component.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
9.	**Title of the project**	**Assessment of the status and characterics of the genetic structure of populations of migratory fish that reproduce in the Lower Danube**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Marian Paraschiv — marian.paraschiv@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Analysis of the ecological status of migratory fish populations in the DDBR. Characterisation of the genetic structure of migratory fish populations in the DDBR. Identify measures and solutions to help reduce the fishing pressure on these fish stocks in the DDBR.
	Project justification: needs identified in the region/county/municipality	This project aims to use advanced technologies to provide a complex picture of the state of economically important migratory fish populations within the Danube Delta Biosphere Reserve.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Study and analysis of the ecological status of migratory fish populations in the DDBR using advanced methods and technologies: identification of migration routes, location and description of key habitats, identification of anthropogenic pressures, etc. Identification of the genetic structure of some migratory fish populations in DDBR using advanced molecular biology technologies: DNA extraction and isolation, use of optimal molecular markers in the assessment of genetic diversity that will ensure the success of the measures and solutions identified in the project. Identify measures and solutions to help reduce fishing pressure in response to anthropogenic activities and degradation of key habitats.
	Complementarity with other projects	—
	Duration of the project	48 months
	Key outputs	Interactive map of key habitats of migratory fish populations studied in the project. Map of the migration routes of the migratory fish populations studied in the project. Biometric database. Database of genotypes identified. Report on the state of migratory fish populations studied in the project. Set of measures and solutions to improve their active conservation status/sustainable exploitation.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
10.	**Title of the project**	**Assessment of the toxicity of chemicals in the Danube Delta using Caenorhabditis elegans transgenic nematode**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Marius Circima — marius.circima@ddni.ro
	Location of the project	Tulcea

	Objectives of the project	Research on understanding the molecular phenomenon of interaction between chemicals discharged into the Danube Delta Biosphere Reserve in sub-lethal quantities and the physiological functioning of the endocrine system from molecular to the whole organism will be carried out by: Identification of chemicals in river waters and delta swabs as well as sediment; Assessment of concentrations and mixtures of chemicals discharged into the aquatic environment which may cause adverse effects in living organisms at different stages of development or at offspring; Testing of different environmental conditions on breeding and developmental biology based on the animal Caenorhabditis elegans model; Using comparative biology concepts from gene expression to the whole organism and populations to understand synergistic effects induced by experimental conditions compared to control; Use and development of a new biosensing tool and application of bioinformatics for the rapid evaluation and detection of polluted waters containing endocrine disruptors; Improvement of European legislation and biosecurity programmes against water and soil pollution and bio-monitoring of the Danube Delta.
	Project justification: needs identified in the region/county/municipality	The aim of this project is to use Caenorhabditis elegans transgenic nematode and molecular laboratory methods to assess the endocrine toxicity of chemicals in vivo and hormonal signalling induced by pollutants suspended in water or/or deposited in Danube and Danube Delta sediments.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Developing a new cheap biosensor detecting polluted waters and endocrine disruptors; Assessment of the inhibition of feeding to nematodes using water and/or sediment samples from the Danube and the Danube Delta; The assessment of the gene expression of vitellogenin in hermaphrodite and the toxicity of water/sediment samples in the DDBR;
	Complementarity with other projects	—
	Duration of the project	48 months
	Key outputs	Patent of acute/chronic toxicity method vit-2: PFM in C. elegans transgenic nematode for endocrine disrupting chemicals; Upgrading the pollution status of the Danube and the Danube Delta by genetic methods; Quarterly scientific research reports. Articles in specialized magazines listed by the ISI.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
11.	**Title of the project**	**Development of a guide for the implementation of Agenda 2030, in the territory of ITI Danube Delta**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Iulian Nichersu — iulian@nichersu @ ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Environmental protection through measures to decouple economic growth from negative environmental impacts. Fairness and social cohesion. Economic prosperity by promoting knowledge, innovation, competitiveness for high living standards and jobs. Fulfilling international responsibilities (e.g. EU Directives, AGENDA 2030)

	Project justification: needs identified in the region/county/municipality	The subject of the proposal is undoubtedly very generous and topical: sustainable development, while promoting Romania's National Strategy for Sustainable Development 2030, adopted by the Romanian Government at its meeting on 9 November 2018, through Government Decision No 877/2018, which was drawn up under the direct coordination of the Department for Sustainable Development. In2015, a historic document — the 2030 Agenda for Sustainable Development — was adopted at the UN General Assembly in New York. With its 17 objectives, this document aims at a better future, not only for us but also for our children. Structured around the three pillars of sustainable development — economic, social and environmental — the 2030 Agenda was also adopted by Romania, and the European Union. 'A sustainable European Future: the EU response to the 2030 Agenda for Sustainable Development "is the political document taken by the EU Member States on the implementation of the 2030 Agenda for Sustainable Development. this strategy is the contextualization of the Agenda to the specificities of Romania. Sustainable development requires both motivating people to choose the way of development that ensures that future generations are at least as comfortable as our own, while at the same time preserving the environment through the rational use of non-renewable reuse of raw materials and energy available to mankind to press, educating the population in order to raise awareness of environmental concerns and adequately adapt the consumption structure to products that involve low raw material and energy consumption, and whose use and residues are such as to reduce the cost of technologies, but also to reduce their environmental costs, and to properly adapt the structure of consumption to products with low raw material and energy consumption, with the necessary reuse and environmental impact, as well as the reduction of raw materials in the environment.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Implementation of SMART concept for SDGs in Romania's Sustainable Development Strategy — 2030
	Complementarity with other projects	—
	Duration of the project	48 months
	Key outputs	Model of sustainable development in the ITI area. Sustainable Development Guide.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
12.	**Title of the project**	**Development of a "Mixed Reality" technology framework in VR/AR digital applications to save the architectural/cultural/natural heritage of the Danube Delta**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Iulian Nichersu — iulian@nichersu @ ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Application in Mixed (augmented/ Virtual) Reality environment to support interactive dissemination of environmental knowledge in DDBR. Smart education — could easily be supported in areas such as biology, zoology, ecology, history, navigation, ethnic habits, multiculturalism, etc. 3D virtual educational models can be integrated into e-learning off courses, for animals, plague, birds, flowers, bushes and trees, and on a website integrated in the application through augmented Reality and Geofencing technology, offering users a framework during selected general visits and information Decreasing pressure on vulnerable habitats.

	Project justification: needs identified in the region/county/municipality	This project aims to use augmented/mixed reality technologies within the Danube Delta Biosphere Reserve to provide a technological product, accessible to all visitors to this specific area. The proposed technological solution will bring together 3 important aspects: The application must combine virtual and actual elements perfectly. Artistic freedom will not be restricted and virtual content must be synchronised with as many real world parties as possible. Be interactive, allowing as much knowledge as possible to be transmitted; Allow users to experiment virtual content through free movement in real space 3d from any angle they deem appropriate; Virtual content must be fixed and permanently accessible as long as a user sees it.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Develop an application in the Mixed (augmented/Virtual) environment to support interactive dissemination of environmental knowledge in DDBR by developing a "Mixed Reality" technology framework for research and sustainable promotion of learning systems for a wide variety of knowledge. The development of Vuforia, i.e. the software component used to represent virtual elements in the context of the real environment, for the development of mobile applications for both the IOS operating system and Android.
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	Multi-layer interactive map. Augmented reality component. Data collection component. Web viewing component. A data analytics module.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
13.	**Title of the project**	**Increase research capacity on environmental behaviour of contaminants with emerging problems (ERC) and antimicrobial-resistant bacteria in aquatic ecosystems**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Adrian Burada — adrian.burada@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	1.Expanding and endowment of research infrastructure; 2.Development of new analysis services of different matrices (water, soil/sediment, biota) for the South East region of Romania; 3.Development and use of infrastructure to identify new classes of high toxicity compounds resulting from the development of industries.
	Project justification: needs identified in the region/county/municipality	Expand existing research infrastructure to address new environmental issues arising from contaminants with emerging problems (ERC) and antimicrobial-resistant bacteria in aquatic ecosystems.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Adapt the set of indicators in the monitoring programmes to the issues of the Danube Delta Biosphere Reserve. Establish the level of contaminants with emerging problems in aquatic ecosystems in the Danube Delta Biosphere Reserve and identify potential changes from the normality status of pathogens and/or bacterial groups characteristic of aquatic ecosystems.

	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	European R & D facility enabling participation and collaboration in research projects on emerging pollutants. Developing policies and strategies to reduce contaminants with emerging problems. Strengthening the capacity to implement policies and strategies to reduce contaminants with emerging problems in institutions with decision-making power on aquatic ecosystems.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
14.	**Title of the project**	**Establishment of the strategy for the assessment and monitoring of environmental factors in order to classify water bodies in the DDBR according to their ecological status**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Iuliana — Mihaela Tudor — mihaela.tudor@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Analysis of hydrological, physical, chemical and biological indicators characterizing the ecological status of aquatic ecosystems. Diagnosis of the ecological status of aquatic ecosystems in the Danube Delta Biosphere Reserve.
	Project justification: needs identified in the region/county/municipality	This project is based on a multidisciplinary approach to assessing the ecological status of aquatic ecosystems in the Danube Delta Biosferi Reserve focusing on providing solutions to local and global pressures respecting EU law (Water and Natura 2000 Framework Directive).Early, the project aims to follow the diagnosis of the ecological status of aquatic ecosystems in the Danube Delta Biosphere Reserve by analysing physico-chemical, chemical (nutrients, pesticides, heavy metals, microplastics) and biological indicators (phytoplankton, zooplankton, aquatic macroinvertebrates, aquatic macrophytes, fish) in order to: Running water • The Danube and main arms • Canals with active water circulation • Canals in natural areas of free circulation of water • Canals inside controlled water exchange polders Standing water • Lakes with stretched aquifers or active water exchange • Low-water exchange lakes partially covered with vegetation • Lakes within controlled water exchange facilities • Separate lakes Research aims to support national and international strategies and policies related to sustainable water management, linking biological, geophysical and governance dimensions within a framework of environmental integrity. Research into aquatic ecosystems linking social needs to understanding hydrological, physical, chemical and ecological processes.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Accumulation of heavy metals in aquatic macroinvertebrates, fish and indicator aquatic macrophytes. Assessment of heavy metal content in the sands and sediments of the Danube Delta and their long-term effects in deltaic ecosystems. Assessment of the ecological status of the ecosystems investigated in the Danube Delta Biosferi Reserve.

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	Complementarity with other projects	
	Duration of the project	36 months
	Key outputs	Assess the dynamics of seasonal changes in the biological, hydro morphological and physico-chemical quality elements of the water bodies in the DDBR. Assessment of the transfer rate of some inorganic micropollutants (metals) from sediment and water to the main groups of aquatic macroinvertebrates in R.B.D.D. Assessment of microplastics pollution in the Danube. Assessment of the current state of aquatic ecosystems in R.B.D.D. Preparation of thematic maps of ecological status and distillates of chemical parameter concentrations and biological indicator values.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
15.	**Title of the project**	**Aquaculture technology park — Caraorman research base**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Irina Cernisencu — irina.cernisencu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	The current state of fish resources in the DDBR. Identification of the species to be repopulated. Construction of the breeding plant. Restocking itself.
	Project justification: needs identified in the region/county/municipality	The analysis of the current state of fish stocks in the DDBR reveals a decline in populations, and therefore annual catches, and therefore action is needed to rebuild stocks by introducing juveniles into lake complexes in order to improve fish stocks and sustainable exploitation.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Documenting the current state of fish resources in the DDBR 2.Analysis of the current state of commercial fisheries resources 3.Identification of species to be artificially propagated and repopulated 4.Construction of the breeding station 5.Reproduction of identified species 6.Restocking of adjacent areas
	Complementarity with other projects	—
	Duration of the project	48 months
	Key outputs	1.Summary of documents on the current state of fish resources in the DDBR 2.Current state of commercial fisheries resources 3.Determination of species to be artificially propagated and repopulated 4.Breeding station for identified species 5.Actual reproduction 6.Release of juveniles in areas adjacent to lake complexes
	Status of the project	—
	Risks	Administrative risks, bureaucracy
16.	**Title of the project**	**Study on swimming behaviour of some fish species found in the territory of the DDBR**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Stefan Hont — stefan.hont@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Determination of the maximum swimming capacity of species of plague of different ages and sizes using modern 'Swim tunnel respirometer' equipment.

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		Determination of oxygen uptake in fish species of different ages and sizes at low, medium and high water flow rates. Modelling and publication of results.
	Project justification: needs identified in the region/county/municipality	This project aims to carry out a detailed analysis of the maximum swimming, oxygen consumption capacities of rheophilic fish species found in the territory of the DDBR that could be affected by growing anthropogenic activities.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Carrying out experiments that will result in the setting of maximum and/or sustained swimming capacity of some fish species in the Danube under different water flow scenarios, i.e. at medium and high speeds. Carrying out experiments that will result in the determination of oxygen consumption of some species of fish in the Danube during different swimming scenarios at medium and high water speeds.
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	Data on maximum and sustained swimming capacities of some fish species in the Danube. Data on the determination of oxygen consumption/needs of some fish species in the Danube under different swimming scenarios. Data collection component.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
17.	**Title of the project**	**Local breeding station for restocking the Danube Delta (Maliuc — Lucerniera)**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Irina Cernisencu — irina.cernisencu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	The current state of fish resources in the DDBR. Identification of the species to be repopulated. Construction of the breeding station. Restocking itself.
	Project justification: needs identified in the region/county/municipality	The analysis of the current state of fish stocks in the DDBR reveals a decline in populations, and therefore annual catches, and therefore action is needed to rebuild stocks by introducing juveniles into lake complexes in order to improve fish stocks and sustainable exploitation.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Identification of species to be artificially propagated and repopulated Documenting the current state of fish resources in the DDBR Analysis of the current state of commercial fisheries resources
	Complementarity with other projects	Native juvenile fish production station for restocking the Danube Delta (Enisala)
	Duration of the project	48 months
	Key outputs	1.Summary of documents on the current state of fish resources in the DDBR 2.Current state of commercial fisheries resources 3.Determination of species to be artificially propagated and repopulated 4.Breeding station for identified species 5.Actual reproduction 6.Release of juveniles in areas adjacent to lake complexes
	Status of the project	—
	Risks	Administrative risks, bureaucracy

18.	Title of the project	**Research Centre for the Ecology of Wetlands and Emerging Transboundary Diseases (Maliuc)**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Lucian Eugen Bolboacă — lucian.bolboaca@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Facilitating access to research technologies inside the Danube Delta. The creation of an accommodation infrastructure for research staff inside the Danube Delta. Early identification of emerging and cross-border diseases in the Danube Delta area. Hub for the development of projects on wetland ecology. Increased cooperation between the relevant institutions through the infrastructure created.
	Project justification: needs identified in the region/county/municipality	This project aims to strengthen the research infrastructure at the Danube Delta level through the creation of a research centre for wetland ecology and emerging cross-border diseases within the Danube Delta.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Cross-border emerging disease research. Research into the ecology of wetlands. Implementation of the research centre.
	Complementarity with other projects	Research centre for wetland ecology/ecological restoration and zoonotic diseases (Chilia Veche)
	Duration of the project	36 months
	Key outputs	Research centre equipped with research equipment on the ecology of wetlands and emerging cross-border diseases. Collaborations with relevant institutes, universities, etc. Infrastructure for carrying out projects related to emerging diseases and wetland ecology. Identification of risks of emerging diseases.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
19.	Title of the project	**Research centre for wetland ecology/ecological restoration and zoonotic diseases (Chilia Veche)**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Spiridon Cosmin — cosmin.spiridon@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Develop systems and protocols to follow in the protection and use of aquatic and terrestrial ecosystems. Assessment of the capacity of the regeneration of transitional ecosystems between the forest lake (agricultural enclosures, natural grasslands, eleşte, lakes). Creation of a multidisciplinary team within the Research Base.
	Project justification: needs identified in the region/county/municipality	• Rehabilitation of the Research Base in achieving the attraction of young researchers to "in situ" research. • Doting the Research Base according to the needs to create the specific conditions for data analysis.
	Nature of State aid	
	Main activities of the project	1.Measurements of physico-chemical, biological, hydrological, atmospheric, etc. parameters on the 4 ecosystems. 2.Identification of the main anthropogenic pressures in the area studied (agriculture, fisheries, tourism, transport). 3.Study of native biomass species (aquatic and terrestrial) involved in natural regulation and control processes.

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		4.Actions to promote and raise awareness of the effects of negative actions on different ecosystems.
	Complementarity with other projects	Research Centre for the Ecology of Wetlands and Emerging Transboundary Diseases (Maliuc)
	Duration of the project	24 months
	Key outputs	1.Database of physico-chemical, biological, hydrological, atmospheric, etc. parameters on the 4 ecosystems. 2.Mapping areas vulnerable to different existing or emerging natural or anthropogenic pressures, major or sustainable impacts. 3.Establishment of "Research hotspots" for the ecosystems covered by the programme.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
20.	**Title of the project**	**Local breeding station for restocking the Danube Delta (Enisala)**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Irina Cernisencu — irina.cernisencu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	The current state of fish resources in the DDBR. Identification of the species to be repopulated. Construction of the breeding station. Restocking itself.
	Project justification: needs identified in the region/county/municipality	The analysis of the current state of fish stocks in the DDBR reveals a decline in populations, and therefore annual catches, and therefore action is needed to rebuild stocks by introducing juveniles into lake complexes in order to improve fish stocks and sustainable exploitation.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Documentation of the current state of fish resources in the DDBR. Analysis of the current state of commercial fisheries resources. Identification of species to be artificially propagated and repopulated. Construction of the breeding station. Reproduction of identified species. Restocking of adjacent areas.
	Complementarity with other projects	Native juvenile production station for restocking the Danube Delta (Maliuc — Lucerniera)
	Duration of the project	48 months
	Key outputs	1.Summary of documents on the current state of fish resources in the DDBR 2.Current state of commercial fisheries resources 3.Determination of species to be artificially propagated and repopulated 4.Breeding station for identified species 5.Actual reproduction 6.Release of juveniles in areas adjacent to lake complexes
	Status of the project	—
	Risks	Administrative risks, bureaucracy
21.	**Title of the project**	**Hydrogeological studies to map the Danube Delta aquifer**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Oliver Livanov, Iuliana Nichersu oliver.livanov@ddni.ro, iuliana.nichersu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Improve the adaptive management system of the Danube Delta protected area by drawing up the hydrogeological map of the area.

		Improving the conservation of the protected area through the quantitative and qualitative determination of the aquifers in the Danube Delta.
	Project justification: needs identified in the region/county/municipality	Determination of hydrogeological indices: underground flow rate, direction, slope of flow, underground flow rates. Groundwater Chemistry.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	A. Collection of hydrogeological data by organising field campaigns in the DDBR area 1.Purchase of equipment necessary for data collection 2.Execution of piezometric drilling on the territory of the Danube Delta 3.Monitoring of drilling B. Centralisation and processing of data 1.Centralisation of drilling data 2.Processing of drilling data 3.Validation of drilling data 4.Development of the hydraulic model of the Danube Delta aquifer 5.Characteristics of local and regional aquifers together with specific hydrogeological indices 6.Highlight the correspondence between the surface and underground hydrographic networks by linking the Danube Delta hydraulic model with the aquifer model C. Qualitative analysis of the Danube Delta aquifer 1.Groundwater sampling 2.Laboratory determinations for groundwater chemistry 3.Quality classification of aquifers in terms of water chemistry D. Transposition of collected information into hydrogeological maps
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	1.Hydrogeological data from all hydrogeological drilling. 2.Characteristics of local and regional aquifers together with specific hydrogeological indices. 3.Aquifers index in terms of water chemistry. 4.The hydraulic model of groundwater and highlighting the correspondence between surface and underground water networks. 5.Hydrogeological map of the Danube Delta.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
22.	**Title of the project**	**Research on underwater heritage in the ITI area**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Cristian Trifanov — cristian.trifanov@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Developing the research capacity of submerged archaeological sites through high-resolution mapping means.
	Project justification: needs identified in the region/county/municipality	Digitisation and interoperability for education, culture and occupation (equipment and infrastructure, databases, software, digital platforms — strategic projects)
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Identification of archaeological sites with sections in the submerse area.

		2.Mapping of Danube sections/canals/lakes where archaeological sites regroup through topographical and bathymetric surveys. 3.Processing and analysis of bathymetric data in order to highlight the submerse structures of the sites studied.
	Complementarity with other projects	
	Duration of the project	12 months
	Key outputs	1.Bathymetric maps. 2.Development of three-dimensional models of submerged and identified structures. 3.Updated maps of archaeological sites. 4.Morphometric maps showing the sedimentation rate linked to historical hydrological events.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
23.	**Title of the project**	**Assessment of the percentage of heavy metals contained in fish species of economic interest in the Danube Delta**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Marian Paraschiv — marian.paraschiv@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Determination of the presence of chemical compounds and their analysis in terms of maximum permitted concentration. Reducing pressure on highly contaminated species by proposing measures to eliminate the toxicological risk:Catch and release, investments in aquaculture farms, etc.
	Project justification: needs identified in the region/county/municipality	This project aims to use specific technologies and chemical analyses to determine the degree of heavy metal pollution of fish species. — The sampling process must include representative areas and species in the Danube and the delta; — The samples will consist of fragments of tissue, intestines and liver, The samples shall be analysed using the latest techniques and procedures for analysis and determination of the presence of chemical compounds. — The results will be interpreted and a reference guide will be developed with fish species of toxicological concern.
	Nature of State aid	
	Main activities of the project	Drawing up maps including: The area and breeding habitats of economically important species in the Danube and the Danube Delta; The main catch areas of these species, Main collection areas (cherhanale). Collection of samples from specified areas (fishing and cherhanale); Analysis of the presence of heavy metals (percentage, incidence, etc.). Information/awareness of the risk of consumption of fish species with high levels of heavy metal contamination.
	Complementarity with other projects	
	Duration of the project	36 months
	Key outputs	Multi-layer interactive map. Data collection component. Percentage and incidence of chemical compounds. Information and Awareness Web Component.

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	Status of the project	—
	Risks	Administrative risks, bureaucracy
24.	**Title of the project**	**Danube Delta Centre for Advanced Research on Emerging Diseases, zoonoses and Environmental Health (Enviro-Health-DD)**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Mihai Marinov — mihai.marinov@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Development of the Danube Delta Centre for Advanced Research on Emerging Diseases, Zoonoses and Environmental Health towards a platform for research/development, training and awareness with local, regional and European partners.Creation of a multidisciplinary team within the Danube Delta Centre for Advanced Research on Emerging Diseases, Zoonoses and Environmental Health. Develop a portfolio of well-performing R & D & I services to increase/improve the health of humans, domestic animals and wildlife. The uniqueness element of the desired research infrastructure will be to carry out targeted research into how the environment through its multiple components affects humans in order to identify measures to reduce human morbidity and mortality (improvement of quality of life). Another major objective is the implementation of the One Health concept, where in order to take a holistic approach, we want to invest the action of pathogens but also physico-chemical factors not only from the point of view of affecting humans and domestic animals but also of wild animals, many of which are threatened or even threatened by local, regional or areal extinction. Thus, another objective of the proposed research infrastructure will be to improve knowledge of the ecology of vectors and reservoir species causing transboundary, emerging and zoonotic diseases in the ecosystems of the Danube Delta and its surroundings.
	Project justification: needs identified in the region/county/municipality	• Land acquisition, construction of the Danube Delta Centre buildings for advanced research into emerging diseases, zoonoses and environmental health and equipping them with research equipment and tools • Enhancing the participation of the Danube Delta Centre in advanced research on emerging diseases, zoonoses and environmental health in increasing the health of humans, domestic animals and wildlife that would respond to integrated approaches to value chains of interest to the region; • Awareness and training.Awareness:by building a visit, information and deployment centre for conferences and other types of scientific events.Training — Training centre for pupils, students, master's students, doctoral students and internships;summer schools, traineeships:sampling (i.e. biological components of the environment), handling, testing and interpretation.Other INCDDD — Tulcea and collaborators' infrastructure units (Chilia Veche, Enisala, Maliuc, etc.) will also be used.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Land acquisition, construction of the Danube Delta Centre buildings for advanced research into emerging diseases, zoonoses and environmental health and equipping them with research equipment and tools. The installation and operation in the Danube Delta Centre of advanced research on emerging diseases, zoonoses and environmental health of chemistry, hydrobiology, genetic, molecular ecology, parasitology and infectious diseases laboratories (Department of the Centre for the Study of Cross-Border Diseases, Emergents and Zoonoses and Zoonoses and the Department of Laboratories and Research Base) will

		be designed for a high level of biosecurity in 5/4 (ND).The equipment shall be for biosecurity level 2. Launching research in partnership with institutes and universities in the region, in the sub-fields of Bioeconomy and Health specific to the South East region: Agro-food, High Performance Screening, Biodiversity, Monitoring the transboundary spread of highly pathogenic micro-organisms with potential for mass spread. Launch research in partnership with institutes and universities outside the South East region (in the country and abroad).
	Complementarity with other projects	—
	Duration of the project	48 months
	Key outputs	Research and development facilities at European level enabling international collaboration in the fields of chemistry, hydrobiology, genetics, molecular ecology and zoonotic diseases. Reference centre for sampling (medium and biological). Research platform and cross-disciplinary teams in the field of the Danube Delta Centre for Advanced Research on Emerging Diseases, Zoonoses and Environmental Health. Improving living conditions (decrease in mortality and morbidity) in humans and domestic animals and increasing the conservation of flora and fauna in the region.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
25.	**Title of the project**	**Ecological restoration of degraded/anthropogenic modified ecosystems in the DDBR by reconnecting them to the Danube hydrological regime**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Marian Tudor — marian.tudor@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Identification and classification/ranking of new ecological reconstruction areas; Modelling (hydrological, ecological, economic) of the effects of ecological reconstruction; Scenarios on the impact of climate change on existing and proposed ecological reconstructed areas; Development of the Strategic Plan for Green Reconstruction in the Danube Delta. The following aspects are taken into account: Conservation and rehabilitation of biodiversity: estimating the increase of the plague biomass, the nesting areas of the flanders; Hydrological modelling tools:1D2D hydro-modelling and especially ecosystem modelling; Ecological restoration, including reforestation: identification/prioritisation of priority areas suitable for ecological reconstruction;
	Project justification: needs identified in the region/county/municipality	One important activity to be done in the DDBR is the restoration of the natural environment, partly destroyed by human activities over the last 50 years and the improvement of the management of these environmental goods and natural resources. In the long term, sustainability will depend on the people of the place who will play an active role as protectors and managers of the cultural and environmental assets of the delta, in partnership with the ADDBR.
	Nature of State aid	
	Main activities of the project	Identification of areas suitable for ecological reconstruction through spatial land use analysis in the DDBR (GIS processing by information layer: soil, hydrology, vegetation, biodiversity, socio-economic).The hierarchy of ecological reconstruction areas will be done statistically (AHP-Analytic Hierarchy Process and PCA-Principal

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		Component Analysis method) using the parameters of the information layers in GIS analysis; The effects of ecological reconstruction will be modelled using existing hydraulic models (Sobek 1D coupled with 2D) and prediction model for the evolution of new ecosystems (Aquatox-water quality, phytoplankton, zooplankton, aquatic vegetation, plague biomass).On the basis of the results, a socio-economic analysis of the effects of ecological reconstruction will also be carried out. On the basis of the global climate change scenarios, the scenarios corresponding to future conditions (ANM prediction 2100, temperature, precipitation, water flow) will be run by quantifying their impact; On the basis of the data/analyses in the points above, the Strategic Plan for Environmental Reconstruction in the Danube Delta will be developed taking into account the five cross-cutting strategic principles of the Integrated Sustainable Development Strategy in the Danube Delta (2030).
	Complementarity with other projects	—
	Duration of the project	48 months
	Key outputs	The scientific basis of the DDBR Environmental Reconstruction Plan; Effective ecological reconstruction solutions in the DDBR; Assessment of the impact of ecological reconstruction at all levels; Evolution of ecological reconstructed areas (current or proposed) with a view to climate change.
	Status of the project	—
	Risks	Administrative risks, bureaucracy

Agro — food and biotechnologies domain		
1.	Title of the project	Assessment of the bioenergy potential of reed natural resources
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Jenică Hanganu — jenica.hanganu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Development of reed harvesting methods for biomass
	Project justification: needs identified in the region/county/municipality	The main objective of the project is to harness the bioenergy potential of natural plant resources in the Danube Delta for the benefit of the local population and in line with sustainable development policies. It is envisaged to implement new economic policies to exploit student resources and to encourage business development related to reed production for entrepreneurs to provide jobs for young people and thus stop their migration from the area.
	Nature of State aid	
	Main activities of the project	The mapping of reed areas suitable for biomass harvesting; Identification of gaps in the legislation concerning the use of the reed for bioenergy Development of a business plan for using the reed as a bioenergy resource Setting-up of 3 pilot projects with local SMEs; Development of sustainable harvesting methodologies; Workshops — Involvement of policy stakeholders; Networking with other projects; Dissemination of project results; Project management;
	Complementarity with other projects	

	Duration of the project	36 months
	Key outputs	• Estimate the total area of reed near the pilot study sites; • Percentage of reed area subject to commercial exploitation; • Percentage of degraded reed area; • Identification of burnt and harvested areas.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
2.	**Title of the project**	**Delta Dunării- Tulcea Wild Animal Recovery and Rehabilitation Centre**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Stefan Raileanu — stefan.raileanu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	The project aims to strengthen the research capacity in the Danube Delta region through the establishment of a centre for the recovery and rehabilitation of wild animals in the Danube Delta. Once the centre was created, a large gap in the flow of infesting biological material on the territory of the delta was closed. The impact of science can be far-reaching and above all with a high preventive capacity to monitor diseases with zoonotic potential. The social impact can also generate new research directions and meet community needs by organising therapeutic activities in the presence of animals.
	Project justification: needs identified in the region/county/municipality	This project proposes to strengthen the research infrastructure at the Danube Delta level through the creation of a wild animal recovery and rehabilitation centre.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	The creation of a technological veterinary centre for the examination and rehabilitation of animals in the Danube Delta; The provision of accommodation facilities for birds and mammals coming from the Danube Delta wilderness; The creation of a diagnostic centre that facilitates the prevention of epidemics or pandemics. Create a social point of interaction by exposing animals that can no longer be rehabilitated and released into the wilderness. Create a key research point for infectious and parasitic diseases. Ethological Study Centre. Centre of practice for students in veterinary medicine, ecology, biology, animal husbandry. Development of an animal transport base under special conditions including sea and land transport. Clinical data centre for diseases with partially well-known etiology Supporting research reports on medical subjects in both the veterinary and human fields. Technology centre for the study of zoonotic diseases
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	—
	Status of the project	—
	Risks	Administrative risks, bureaucracy
3.	**Title of the project**	**Experimental field for research in conservation/restoration of organic soils in wetlands**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Marian on Wednesday — marian.mierla@ddni.ro

	Location of the project	Tulcea
	Objectives of the project	
	Project justification: needs identified in the region/county/municipality	This project aims to use specific technologies for the sustainable exploitation of resources within the Danube Delta Biosphere Reserve in order to provide a viable alternative to plant resource management. The proposed technological solution will bring together 3 important aspects: Sustainable exploitation of plant resources; Protection of soil resources in the protected area; Awareness of the risk of unsustainable exploitation.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Not specified
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	Improving resource efficiency in the Danube Delta Biosphere Reserve; Protection of soil resources; Awareness of the risk of overexploitation of resources in the Danube Delta Biosphere Reserve.
	Status of the project	—
	Risks	Administrative risks, bureaucracy
4.	**Title of the project**	**Use of biocompounds from by-products/plant waste in the creation of functional food**
	Project Proposant	University "Dunărea de Jos" Galați
	Contact details	Barbu Vasilica — vbarbu@ugal.ro
	Location of the project	Galati
	Objectives of the project	1.Development of a coherent analytical algorithm for nutritional and functional characteristics of plant matrices and microbial strains with probiotic potential 2.Development at laboratory level of specific technological process steps (processing, extractions, micro encapsulations, critical technological steps with an impact on nutrient and functional content of matrices) 3.Development and implementation of the integrated RDI system — pilot production — validation of the technology process transferred to the industrial level 4.Development of new bio-based products with high functionality value in the food and/or supplements industry — minimum 4 optimised and tested prototypes.
	Project justification: needs identified in the region/county/municipality	There are many wastes from the food industry, from processing fruit and vegetables, which not only have valuable active biological compounds that are not used, but are also an important source of environmental pollution. According to the current principles of the circular economy, this waste/by-product is not fully recovered. The project aims to make the most effective use of these phytoutrients in the form of powders to be added to various formulations in innovative foods with functional properties. The main challenges would be to find the most efficient ways of extracting and micro-encapsulating these bio-based compounds in order to increase their stability and bioavailability.
	Nature of State aid	
	Main activities of the project	Selecting efficient, modern methods for extracting biological active compounds from eggplants shells, onion shells, tomato skin, etc. Development of original, innovative micro-encapsulation formulations of these compounds in biopolymeric matrices (chitosan, casein, acacia gum, whey protein isolate, etc.) with or without probiotic lactic bacteria. Designing functional foods incorporating previously obtained powders for the nutrition of children, the elderly or people with special diets.

		Transfer of technologies from laboratory to pilot scale in Bioaliment-TechnIA pilot stations. Technology transfer from pilot to industrial scale with the help of a Food Industry (SME) partner.
	Complementarity with other projects	
	Duration of the project	36 months
	Key outputs	Identification of the main bio-based compounds of wastes/by-products from fruit and vegetable processing (polyphenols, flavonoids, anthocyanins, carotene, helicopter, chlorophyll, etc.) Quantification of extracts obtained by different extraction methods and statistical analysis of data Production of scientific reports, publication of results in ISI journals, patenting of original extraction methods. Obtaining microencapsulated powders at laboratory level, with verification of encapsulation efficiency, stability and digestibility, through in vitro and in vivo studies. The production of scientific reports, the publication of the results in ISI journals, the patenting of original micro-/nanoencapsulation formulations. Incorporation of microencapsulated powders in suitable food matrices (dairy products, vegetable spreads, instant juice powders, salads or sauces, etc.) Production of scientific reports, publication of the results in ISI journals, patenting of original functional food formulations. Adaptation of technology processes/schemes/flows for pilot stations. Development of min. 6 technology schemes linked to prototypes of finished products. Industrial-scale deployment of selected technologies adapted to the profile of the industrial partner, market studies and seasonal agricultural production. Generic design and industrial operation of technological flows — elaboration of proposals for technical production files for a minimum of 4 prototypes of products.
	Status of the project	https://www.unicer.ugal.ro/images/tehnia/anexe/Annex_1_Publications_TehnIa.pdf https://www.unicer.ugal.ro/images/tehnia/anexe/Annex_2_Projects_TehnIa.pdf https://www.unicer.ugal.ro/images/tehnia/anexe/Annex_3_Patents_TehnIa.pdf
	Risks	Administrative risks, bureaucracy

Tourism domain		
1.	Title of the project	**Integration of solutions supporting sustainable mobility in the area (cycle friendly facilities and services, electric cars, etc.)**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Iuliana NICHERSU — iuliana.nichersu@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	The project proposes to integrate scientific knowledge about climate and mobility by applying successful participatory approaches such as Living Labs. The overall objective is to build on scientific knowledge and co-created knowledge to better integrate climate change mitigation and mobility actions into local and national sustainable development strategies. This will be achieved by sharing and transferring knowledge using the Living Lab approach to engage and network citizens and stakeholders to develop solutions tailored to national and local contexts.

		Working with citizens on sustainable mobility ideas based on cycling activities and green infrastructure, the project will move forward with one step further in achieving sustainability goals in the context of climate change mitigation. In combination with these solutions, the project will provide a set of climate change mitigation scenarios that will support the integration of sustainable mobility actions into strategies.
	Project justification: needs identified in the region/county/municipality	Romania ranks first among EU countries in terms of cycling and pedestrian fatalities, as the ratio between the number of casualties and the total population shows the latest Eurostat data. While there are some initiatives regarding the development of cycling infrastructure and the promotion of new sustainable mobility patterns, the county of Tulcea does not have an integrated cycling infrastructure system, with only the road or pavement being used for cycling purposes. Also, current local strategies do not yet include these structures and co-creation of local knowledge is not used in this process.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	— Implementation of Living Lab practices on mobility and climate action (activities related to co-creation and translation of knowledge and understanding towards relevant stakeholders); — Proposal of cycling and green infrastructure solutions to achieve sustainability objectives in the context of climate change mitigation (activities related to more knowledge and exchange of experience through networking between stakeholders) — Developing a set of qualitative mobility scenarios and spatial mobility models related to sustainable spatial planning and climate change mitigation — Proposals for local or regional sustainable mobility actions in study areas (urban and rural) relevant to specific environmental issues and climate change Develop recommendations for integrating sustainable mobility actions into sustainable development strategies with climate change mitigation issues.
	Complementarity with other projects	—
	Duration of the project	24 months
	Key outputs	— A set of ideas co-created within a network based on groups of citizens and stakeholders that revolute around these ideas on sustainable smart mobility at local level. All co-created knowledge will be centralised and publicly presented using Living Lab platforms. — A set of indicators to be followed by the project — A set of qualitative scenarios and spatial mobility models that will support the recommendations made to update the strategies. Recommendations for updating local, regional and national policies. — Set of chapters that could be inserted into new policies and visions on the use of sustainable mobility.
	Status of the project	-
	Risks	Administrative risks, bureaucracy
2.	**Title of the project**	**South — East Tourism and Health Centre — Integrated concept of medicine and tourism based on healthy lifestyle**
	Project Proposant	IMMUNOMEDICA PROVITA SRL
	Contact details	
	Location of the project	Constanta
	Objectives of the project	The overall objective of the project is to develop a tourism and health centre on an area of 2 hectares with a capacity of 100 places that is a multifunctional centre

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		integrating a clinic with innovative treatments, a hotel with accommodation and a sports base (sports grounds, swimming pool, riding). The specific objective is to integrate tourism, medical and sport (movement) services that improve the health of more than 1000 patients per year.
	Project justification: needs identified in the region/county/municipality	
	Nature of State aid	
	Main activities of the project	Building the Multifunctional Centre — Clinical — Hotel — Sports Base; Development of innovative health services — hyperbar pressure treatments, hyperthermia, ozone therapy; Developing customised menus for customers by integrating medical advice into the diet; Implementation of a patient movement programme: kinetotherapy and sport; Development of an integrative research laboratory following the relationship between lifestyle, medical therapy and the evolution of patients' health.
	Complementarity with other projects	
	Duration of the project	36 months
	Key outputs	
	Status of the project	
	Risks	Administrative risks, bureaucracy
3.	**Title of the project**	**Cycling tourism infrastructure using new technologies in the South East Region**
	Project Proposant	Basarabii Association
	Contact details	Vastea Răzvan — Razvan.vastea@yahoo.com
	Location of the project	South East Region
	Objectives of the project	General objective:The creation of adequate infrastructure for the development of niche tourism (cycling tourism) in the South East Region; Specific objectives: OS1:Building the "soft" infrastructure for cycling tourism in the South East Region (recording of GPS coordinates of routes, development of Android/iOS application, development of markings to be placed along the routes (data related to monasteries/historical objectives/local legends/flora and fauna elements/architecture/craftsmen, etc.); OS2:The location of the beacons connecting information to tourists; OS3:Promotion of cycle tourism routes at national and international level; OS4:Integration of local SMEs into cycle tourism routes (cellars, rocks, local white-collar, etc.);
	Project justification: needs identified in the region/county/municipality	Lack of a soft/hard cycle tourism infrastructure in the South East Region; Lack of an integrated strategy to promote cycling tourism in the South East Region. Care for people with disabilities.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Setting up a regional cycle tourism centre and equipping it; Mapping of cycling tourism routes; Implement Android/iOS Making the physical markings that will be placed along the routes (data related to monasteries/historical objectives/local legends/elements of flora and fauna/architecture/births, etc. Virtual markings — Beacon *

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		* Beacon — small devices that transmit an identifier via Bluetooth Low Energy to the surrounding phones, which obviously have to run an app that is on the reception. Once the app receives the submitter's ID, it connects to the net and asks its database "have I received an ID from a beacon, what's up with it?".The server thus knows the location of the receiver (knows where the beacon was placed) and transmits the useful information on the user's smartphone. Promotion at national and international level. Attract economic actors from the South East Region and integrate them into the Android/iOS application and develop innovative tourism services.
	Complementarity with other projects	Integration of solutions supporting sustainable mobility in the area (friendly cycle facilities and services, electric cars, etc.)
	Duration of the project	36 months
	Key outputs	1 modern Cycling Tourism Centre in the South East Region; The mapping of 100 interconnected routes in the South East Region; An Android/iOS application; 3000 markings of different sizes; Location of 5000 beacons on cycle tourism routes; Developing an integrated concept of tourism with recognizable graphic identity; Promotion on social media; Producing high-quality short promotional films (drones, professional videos, etc.); Membership of international cycling organisations; Promoting routes through the organisation of competitions (cycling on the wife, mountain bike, Downhill); Organisation of tastings — Cramele as a point of interest for tourists (the SE region comprises 42 % of the total area planted with vines in Romania);Tourist and agri-tourism guesthouses; Local craftsmen; sheepfold, etc.
	Status of the project	Feasibility study of carrying out the cycle route in Ciucas Mountains proposed in the framework of an EAFRD project M313-2012-100 km of journey; The sea appears on the bank of the Danube — Calarasi — 2017-100 km of routes marked in the Calarasi county.
	Risks	Administrative risks, bureaucracy
4.	**Title of the project**	**Danube Delta Cluster**
	Project Proposant	National Institute for Research — Development of the Danube Delta (INCDDD)
	Contact details	
	Location of the project	Tulcea
	Objectives of the project	Sustainable development of tourism in the Danube Delta Biosphere Reserve (DDBR), linked to the sustainable development of other traditional economic activities in the DDBR; Creation of the Danube Delta Tourism and Sustainable Development Cluster; The development of tourism and sustainable traditional economic activities in the DDBRs through increased innovation; Establish a local destination-based management mechanism based on the active involvement of local stakeholders.
	Project justification: needs identified in the region/county/municipality	
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Creation of the cluster management unit; Endowment of the cluster management unit: headquarters furniture, purchase of equipment and team/ personnel creation; Creation of an integrated local destination management IT system;

		Developing DDBR as an integrated destination for tourism with a rich portfolio of sustainable products and services: integrating types of tourism and adapting to regional specificities: science tourism, gastronomic tourism, sports tourism, tourism linked to traditional delta activities; Online and offline promotion of the natural and cultural attractions of the area (online and offline events); The creation of innovative tourism products and services; Creation of a slow tourism infrastructure: walking routes, bicycles, riding, nautical sports, campsites; The creation of a training centre for all professions in the field of sustainable tourism (v. eco-guides); The integration of traditional activities in the DDBR into the sustainable development of tourism in the DDBR; Symposia and workshops in the municipalities of DDBR to encourage the local population to open small tourism businesses that meet economically viable quality and sustainability standards.
	Complementarity with other projects	
	Duration of the project	36 months
	Key outputs	
	Status of the project	
	Risks	Administrative risks, bureaucracy
5.	**Title of the project**	**Murighiol, balneoclimateric station**
	Project Proposant	Danube Delta LAG Association
	Contact details	George Roșca — Georgerosca56@gmail.com
	Location of the project	Tulcea
	Objectives of the project	Generalobjective: Development of the (local) community in Murighiol through smart and sustainable exploitation of local natural resources and diversification of the economic activities of local economic operators. Specific objectives: • Research and placing on the market for specialist services a new product for the treatment of rheumatic conditions — Murighiol sludge and support for physical and mental recovery; • Building a modern treatment base (mixed structure: specialised medical treatment + spa tourism) • Developing new or substantially improved models and methods for the provision of specific services by: Implementation and use of innovative technologies in the healing process (spa therapy, physiotherapy and art therapy, etc.); Integration and unification of specialist services — hospital spa treatment and preventive and recovery treatment — digitalised monitoring and assistance to local economic operators (consultation, diagnosis, planning and follow-up of procedures, reporting, post-treatment monitoring) and providing interface with public settlement systems (health homes, pension funds, private health insurance) The implementation of Telemedicine and Virtual Reality [VR] tools in the assistance of medical consultation and treatment procedures.
	Project justification: needs identified in the region/county/municipality	In line with the development strategy of the municipality of Murighiol for the period 2014-2023, the priority needs resulting from the diagnostic analysis carried out were: Raising the living standards of the local population by reducing poverty, increasing employment by attracting economic investment in the area, developing

		basic infrastructure and adequate services in the territory, tourism including the preservation and promotion of local heritage, supporting the development of social infrastructure in the territory and associated social services, developing or setting up non-agricultural activities in the territory with the aim of diversifying the local economy, reducing the depopulation of villages in the municipality of Murighiol.
		With regard to tourism, the major problems identified are: Short stay period, Reduced offer of related activities and services "Development of Black Tourism", Difficulty of lending and securing credits for the co-financing of tourism projects, Cooperation as a form of development of integrated tourism services.
		In the current context, including the international one, combined with this pandemic, the practice of small-scale tourism (guesthouses, vineyards, bungaloes, etc.) has been restored, mainly rural tourism. Thus, the Danube Delta area became very attractive this year, with the percentage increase in the number of tourists compared to last year being the highest compared to the other rural tourist areas in the country. What was the cause of this change? The safety induced by this huge green area representing Delta Dunari. Analysing the needs of the local community and in particular: the growth of jobs, the exploitation of natural resources, the increase in tourists' stay, the diversification of services combined with changes in tourist preferences to health care services and Wellness products (healthy food, spa and fitness experiences, access to nature) and the opportunity offered by ADR2SE to finance the project and to be able to declare Murghiol a BalneoClimateric Station — a local climate, have naturally led to the structuring of this project.
		Cooperation between local authorities, initiatives by private economic operators, including collaborative support structures between APL and business, has been completed over the last 4 years with notable results, and the partnership with the LAG DELTA DUNARII has led to the implementation of public tourism infrastructure projects (Information Centre and Cultural Area), building sites (roads and canalisers) and mobility (tourist port development).
		This project aims to develop the community in economic terms but also in terms of social cohesion by coordinating several smart specialisation actions in order to concentrate the resources of the local authority as well as the resources of the actors involved (public authorities, universities, R & D institutes, SMEs).
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Construction of a treatment base with a capacity of 75 patients/day for remote treatment and assistance and necessary attachments (including research) + assisting 20 supervised accommodation places located at local tourist reception facilities. In this case innovation is defined by digitalisation: telemedicine diagnostics, digitalisation of medical surveillance processes, patient monitoring in the treatment and post-treatment cycle, coordination tools for community economic operators specialising in spa services, recovery and spa tourism.
		2.Building infrastructure for access to the treatment base (water, sewerage, road, electricity, etc.) and public infrastructure for balneo-climatic static status.
		3.Production and approval of Murighiol sludge. In this case innovation is defined by:applied research produced, adaptation and authorisation of flexible treatment and recovery procedures — national novelty.
		4.Applied innovative technologies: Ozone therapy, plasmapheresis, Telemedicine, [VR] for treatment procedures, combination of physical recovery with mental recovery — innovative instruments in the sense of association with spa treatment and physical recovery.
		5.Development, implementation and authorization of a mental recovery system (consolidation of pro-social behaviour and stress management) associated with spa treatment and physical recovery — the absolute novelty at national level.

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	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	A treatment base with a capacity of 75 patients/day, an inner hot water basin, one freshwater and one with salt water, the beach at the lake bank; Accommodation for base and research team staff; The administrative annex; Landscaping in line with the specific nature of the activities carried out at the treatment base; 40 patient monitoring terminals accommodated in accommodation sites in the local community; X metres from the arrival on two lanes of access to the base; Y metres of drinking water supply pipes; Z metres of sewage pipes with connection to the public network of the municipality of Murighiol; Transformer and record on the electrical network of the municipality; A spa product, sapropelic namol of Murighiol, approved by the Ministry of Health. 4 innovative treatment technologies An innovative mental rehabilitation system; Specialised, multi-sectoral IT support — innovative product.
	Status of the project	The project idea is based on the following realities: • Historical existence of the balneo-climateric static status of the municipality of Murighiol • Use over a long period of time with notable evictions of namol extracted from the brine lakes Murighiol 1 and 2; • Local residents' ability to routinely use a traditional method of treatment/health, namely the Lipova bath, which is a UMEDA sauna method combined with silver burning and sequence of cold showers; • the inclusion of these investments in the Murighiol development strategy As regards the preliminary studies accompanying the Feasibility Study, the Topographic Study is started and the Geotechnical Study is being contracted.
	Risks	Administrative risks, bureaucracy
6.	**Title of the project**	**Promoting the concept of "Passive House" for accommodation in sustainable facilities in the ITI area**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Mădălina Sbarcea — madalina.sbarcea@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	General objective: • Increase the quality of the environment built in the DDBR and the whole of the Danube Delta ITI territory and strengthen the concept of eco-tourism • Align tourism infrastructure with European directives and national legislation on energy efficiency in buildings • Integration of sustainability criteria associated with passive buildings into procedures/methodologies for evaluating projects financed by public funds/European funds

	Project justification: needs identified in the region/county/municipality	Promoting the concept of "Passive House" in the development of tourism infrastructure in the ITI area with the aim of strengthening a low-carbon tourism infrastructure in line with the Sustainable Development Goals and the climate targets set in the Paris Agreement. A passive house is a house that consumes very little resources to reach a very high level of comfort. The passive house standard follows 5 basic principles related to thermal insulation; avoidance of thermal bridges, glazing, air tight tyre and system for mechanical ventilation and heat recovery.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Dissemination and awareness of the passive house concept, in particular among investments in tourism, local authorities and civil society (promoting the passive house concept in the development of tourism infrastructure). 2.Knowledge transfer to private investors (IATTC/SME). 3.Making trainings according to Passive House and EnerPhit standards (new buildings and renovated/rehabilitated buildings) for civil engineering professionals and civil servants. 4.Develop recommendations for integrating the Passive House criteria into the evaluation procedures for publicly funded projects/European funds and for the energy efficiency of tourism infrastructure in the ITI area.
	Complementarity with other projects	—
	Duration of the project	24 months
	Key outputs	1.Increased design/assessment/execution capacity of nearly zero, zero or even positive passive buildings (indicator: number of graduates of courses organised by the project); 2.Increased awareness among tourism investors, tourists and local populations; 3.Action plan to improve the energy efficiency of tourism infrastructure in the ITI area; 4.Recommendations for the integration of passion house criteria into the evaluation procedures for projects financed by public funds/European funds in the ITI area.
	Status of the project	—
	Risks	—
7.	**Title of the project**	**Proposals to revitalise and refunction industrial heritage in the ITI region**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Mădălina Sbarcea — madalina.sbarcea@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Identification and integration of unused industrial heritage objectives in the ITI area into future urban/territorial development plans and strategies; Support the re-integration into the economic circuit of industrial heritage buildings which are currently untapped through refunctionality.
	Project justification: needs identified in the region/county/municipality	Political, economic, technological changes in recent decades have led to important changes in urban and rural morphology. Entire areas of cities or their surroundings have remained abandoned as a result of the discontinuation of industrial activities, which are in urgent need of revitalisation, especially in an urban development policy such as "infill development". Industrial heritage is/has been an important territorial and architectural component of many settlements (rural, urban) in Romania. According to Law nr.6/2008 on the legal regime of technical and industrial heritage, its composition is very clearly explained:' The following categories can be identified from a typological and functional point of view: Industrial construction (workshops, halls, warehouses,

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towers and water castles, etc.), civil engineering (dwellings, buildings with administrative, religious, etc.), areas of exploitation and processing of natural or surface resources, construction for transport and infrastructure, machinery and installations, cultural — industrial landscapes (which also includes the intangible component of industrial heritage), public or private documentary funds.'

The historical, technical, architectural and urban relevance — in fact, of these places — remains insufficiently known to the public and even to professionals .It is of utmost importance, therefore, to know these 'traces' of the industrial past and to identify significant sites for intervention either through revitalisation or ranking.

	Nature of State aid	Nonrefundable funds
	Main activities of the project	Identify, map and map at regional level industrial buildings that are currently dismantled/abandoned/unused, and propose solutions to revitalise them through new functions that reintegrate them into the economic cycle (compatible with history, legal situation, urban or rural, urban or extra-urban location, invasions, etc.).
	Complementarity with other projects	—
	Duration of the project	24 months
	Key outputs	Mapping and visualizing all industrial heritage objectives with potential for revitalisation and or functional reconversion at regional level (databases; maps) Detailed data sheets for all identified objectives Proposals and recommendations for revitalisation/ refunctionality, identifying also potential sources of funding for these operations and inclusion in future strategies
	Status of the project	—
	Risks	—
8.	**Title of the project**	**Nature-based solutions for adapting to climate change and increasing the quality of life in the urban environment**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Mădălina Sbarcea — madalina.sbarcea@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Improving the quality of life in the urban environment and citizens' health by implementing nature-based solutions; Mitigating the effects of climate change through SBN implementation
	Project justification: needs identified in the region/county/municipality	Nature-based solutions have taken on an important role in urban and territorial planning strategies and policies as key solutions to address current socio-economic and environmental challenges. Nature-based solutions usually address complex issues and bring a number of benefits, most of which can be assessed in terms of ecosystem services. Using nature-based solutions (NSBs) to address different urban environment issues: urban heat islands, mitigation of the effects of torrential rain, air quality, noise pollution, reduction of the need for scrapping/ventilation in buildings, etc. Proposals for solutions such as green cover, green façade of buildings, alignment plantations or urban parks, green blue corridors, permeable pavements, bioretention measures, built-up wetlands, urban agriculture areas, etc., use ecosystem services to mitigate the effects of climate change and increase the quality of life in the urban environment — with social, economic and environmental implications.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Transfer of knowledge from previous studies and best practices to public authorities in order to promote public investment in nature-based solutions; Consultation of stakeholders and the population through workshops, urban laboratories, etc.;

		Actions to raise awareness of the benefits of nature-based solutions and to encourage citizens' initiatives in the development of projects on a smaller or larger scale; The development of proposals for the implementation of nature-based solutions in the territory of the ITI IDA; Nature-based solutions will be chosen according to: • Scale and complexity (from isolated green elements of variable size to spaces connected in green networks or corridors connecting different localities) • The challenge (climate action — adaptation, resilience, climate change mitigation; environmental quality; health and well-being; social fairness; urban regeneration, etc.); • Urban implementation context (indoor green spaces, vegetation outside buildings, parks and (semi-) natural urban areas, grey infrastructure with green elements, 'blue' areas, abandoned areas, etc.); • Mechanism of action (water retention and/or purification, CO2 sequestration, shading, etc.); • The level of engineering involved (from conservation of natural areas not involving technological interventions to applied technologies for creating new ecosystems — green roofs and facades, built-up wetlands, etc.) • Social function (recreation, sport, community gathering, cultural, spiritual, food production); • Type of initiative and/or ownership: public administrations initiative (implementing measures from urban development plans and strategies), grassroots civil society actions, public-private partnerships, research, entrepreneurs or other private actors.
	Complementarity with other projects	—
	Duration of the project	24 months
	Key outputs	Action plan for the implementation of nature-based solutions in the ITI ADI region; Increased number of public or private investments in nature-based solutions; New citizens' initiatives on the implementation of SBN at micro or mezzo level (residential complex, neighbourhood).
	Status of the project	—
	Risks	—
9.	**Title of the project**	**Restoring the history of the Romanian citadels in Dobrogea using virtual and augmented reality technologies.**
	Project Proposant	Lower Danube University
	Contact details	Luigi.mistodie@ugal.ro
	Location of the project	Galati
	Objectives of the project	General objective: The creation of a smart integrated Cloud Base platform, based on VR or AR techniques for PC — Web and mobile — Android, to restore and immerse us using a moderate, dynamic and interactive way, in an inciting visit to the Danube Romanian citadels in Dobrogea. Specific objectives: Develop RV-based smart modules for: - Return to Roman times. - Smart restoration of objects that are broken down or incomplete from Roman citadels.

		- Developing various routes for virtual visits of citadels using aerial images. Develop smart modules based on AR techniques to: - Development of guided tours within the citadels using AR techniques. - The visitor is transformed into a treasure hunter. - Cruise on the Roman Danube to visit roman citadels Durostorum and Dinogetia. Web base and mobile Android applications, based on Google Maps, The development of interactive dynamic modules, in which the tourist stories the experience — obtained from the most interesting descriptions of their own experience during the visit of the citadels. Technical and educational activities of scanning, prototyping and 3D taking
	Project justification: needs identified in the region/county/municipality	A multinational effort belonging to Croatia, Serbia, Bulgaria and Romania has recently been completed in the UNESCO World Heritage List "Frontiers of the Roman Empire — The Danube Limes (Lower Section)" (https://whc.unesco.org/en/tentativelists/6446/). Romania contributes to the list of component parts with 49 archaeological, auxiliary castre and other linear fortification sites, both north and south of the Danube, stretched from Pojejena (jud.Caraș-Severin) to Murighiol (jud.Tulcea). The 'Limes' National Programme (https://limesromania.ro/ro/articole/despre-proiect/misiunea-noastra/) proposes, inter alia, in the field of economic development, tourism and education: Collaborating with entities promoting the areas where the monuments that make up the limes from a tourist point of view are located; Promoting local interests in the promotion of limes-related actions. Encourage the direct participation of local communities in research and promotion of monuments using available media, together with direct communication with community members. The Living Danube Limesproject is: Capitalising of heritage, development of sustainable tourism and creation of a cultural route by highlighting the common heritage of Roman fortifications on the Danube. Living Danube Limes is a project funded under the Interreg Danube transnational programme and aims to connect, revitalise, research, preserve and highlight the Danube Romanian fortifications (limes) as a valuable trans-national cultural heritage, with a view to creating a future European Cultural Route. Analyse and promote the role of virtual Romanian authorities (VCRs) as a strategic resource for Romania and Europe — cultural, social and economic value. Discussions at expert level will take place between all stakeholders in promoting the CRV (public and private) in order to achieve consensus in policy, legal and technical areas for the benefit of the community as a whole. The use of modern digitisation tools such as Virtual Reality — VR, augmented Reality — AR, 3D scanning and modelling, processing in Cloud based on artificial intelligence techniques, in restoring the lives of Romanian Dobrogea citizens, will lead to the promotion of sustainable tourism, the best use of historical heritage and the results achieved in the InterReg, Digital Europe, Culture 2000 projects. The applications developed in the framework of the platform will help to increase visibility in social media, TV, press, workshops, conferences, etc. in Romania and in Europe.

		The platform is expected to contribute to a better promotion of the area and an increase in tourism activities.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Historical and archaeological research and documentation
		Determination of the software tools used in the project
		Development of applications based on VR techniques
		Development of applications based on AR techniques
		Developing an interactive module through the contribution of the most interesting descriptions of their own experience during the visit
		The production of an interactive virtual map from the Roman period, simulating the movement between different areas of the Roman Empire, according to ancient times (Roman roads, mixed routes with land and land, lotca, etc.).
		A competitive technical and educational activity whereby pupils and students will participate in the production of 3D templates, which are printed.
		A competitive technical and educational activity whereby pupils and students will participate in the production of 3D templates, which are printed.
	Complementarity with other projects	No
	Duration of the project	36 MONTHS
	Key outputs	The project idea is based on the following realities:
		• There is a large number of tourist routes that include visits to Romanian treasures
		The 'LIMES' National Programme — Minister for Culture amended previous orders to organise the Limes National Programme earlier this year, through WTO No 2544/29.01.2020. http://limesromania.ro/ro/articole/noutati/limesul-pe-lista-indicativa-unesco.html
		• Limit on the UNESCO Indicative List — Recent, the process of inclusion in the UNESCO Indicative List of the World Heritage Sector called "Frontiers of the Roman Empire — The Danube Limes (Lower Section)" has been completed, a multinational effort belonging to Croatia, Serbia, Bulgaria and Romania.Romania contributes to the list of component parts with 49 archaeological, auxiliary castre and other linear fortification sites, both north and south of the Danube, stretched from Pojejena (jud.Caraș-Severin) to Murighiol (jud.Tulcea). https://whc.unesco.org/en/tentativelists/6446/
		• Heritage is our legacy in the past, with which we now live and leave it to the next generation.Our cultural and natural heritage are both sources of life and inspiration, irreplaceable. World heritage sites belong to the peoples of the world, no matter where they are located.
		• Continuing the results of the project:"Interactive visualisation of ancient Roman cultural heritage for the cross-border area Bulgaria and Romania
		INTERREG V — ROMANIA — BULGARIA
	Status of the project	Started
	Risks	—

Information and Communication Technology (ICT) domain		
1.	Title of the project	UGAL Smart Campus
	Project Proposant	Dunarea de Jos Galați University
	Contact details	Catalin Arama
	Location of the project	Galati

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	Objectives of the project	Our objective to implement the SMART Campus project is evolving to create and maintain a digital campus of the future — the next generation campus that continuously modernizes over time. Our aim is to make this translation naturally and to implement a digital campus project by transforming the current UGAL campus into a smart campus, being aware of the impact such a project also has on the community by boosting the implementation of digital processes also in the city and in the region. Through the project's activities, we respond to our need for interoperability and standardisation, ensure trust and safety for all participants in the educational act as well as the activities of the UGAL campus, ensure fast and ultra-fast access to the internet and resources of the university — for study, research, collaboration, etc., respond to the need to increase digital literacy, digital skills and inclusiveness for all those involved in LAG activities, who will benefit equally and to the full from the benefits of ICT services.
	Project justification: needs identified in the region/county/municipality	The field of higher education is at the crossroads of an astonishing digital shift. Higher education around the world is now facing a complex disruptive transformation also due to the expectations of the mass of students who are digital native and want a more intuitive experience that fosters results from another level of digital-innovative integrated approach.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	—
	Complementarity with other projects	—
	Duration of the project	—
	Key outputs	1.Human trafficking meter system with TCP-IP accessible cameras, including cameras and their installation. The innovative element is the video analysis and image processing system taken from the cameras, which, on the basis of predefined scenarios alarming the campus's centre of command according to the identified event/incident. Data storage, data protection and security are defining elements in the project. 2.Building/dispatching — purchase/construction of building and/or land for construction (including construction/development of utilities serving the investment) and refurbishment and equipment bringing together related screens, data storage and processing equipment (date of the center), infrastructure specified to meet the objectives and the team involved in the management and management, maintenance and maintenance of the project. 3.Independent water and air quality analysis stations and monitoring of energy efficiency of TCP-IP transmission, SCADA control software 1 unit 4.External Digital signage system with environmental protection IP65, antivandal construction, operating temperature -40C at + 55 C, for more than 50000 hours (5,6 years at 24 hours 7 days per week), touch screen option, TCP-IP connection, local media player computer, diagonal 65 "/75", system enabling the scheduled transmission of messages to students, teachers and staff. 5.Cofret connection Smart Campus location to the metropolitan optic fiber network (IP65 metallic shuttle, antivandal, fiber-adapter, router, power supply for PoE devices) 6.Secure wireless access and management infrastructure for the network and equipment on the whole surface of the UDJG campuses covering educational and research areas, as well as lotteries for students (48 buildings, over 125.000 m², 12.000 students, 3000 curves, 1500 administrative staff and collaborators) 7.Software applications: Portal software application, software applications control and management Digital signage Content, applications software consolidation of

		8.Hardware Infrastructure (rack 19 server, workstations, back-up unit, storage, data protection, routers, switches, UPS, rack 19' 42 U with ventilation, color xerox) 9.Operating system licences, virtual system, antivirus, automatic back-up, continuity 10.Outdoor public address system with amplifier, shutter protection, external connections and loudspeakers. 11.Sensors measuring the quality of indoor and outdoor environmental factors. 12.BMS system for integrated management of building installations provides centralised control of electrical and mechanical equipment in order to make energy consumption more efficient and to ensure temperature, pressurization, humidity, lighting, safety and security of life, while meeting comfort and safety needs. 13.Works on electrical infrastructure, construction and installation in the park (cameras and public address loudspeakers, foundations and metal constructions for screens and installations, data cabling and electricity supply, wireless antenna installation infrastructure, etc.), as well as adapting the networks to the forecast of consumption. 14. partial and final audit of the security of the network and IT application
	Status of the project	—
	Risks	Administrative risks, bureaucracy
2.	**Title of the project**	**South-East Artificial Intelligence Centre**
	Project Proposant	CRAU
	Contact details	Răzvan Vastea — razvan.vastea@yahoo.com
	Location of the project	South East Region
	Objectives of the project	Generalisation of artificial intelligence components into simple and powerful tools, available to all social classes and age groups, in the fields of agriculture, education, health and surveillance. Developing advice and technical support solutions for new innovative companies through the transfer of technological "know-how" with the aim of increasing their survival rate.
	Project justification: needs identified in the region/county/municipality	The Artificial Intelligence component is one of the main drivers of today's and tomorrow's industrial development.I ts importance has increased so much that there are developed countries and economies where Artificial Intelligence is represented through a dedicated ministry. Digitalisation, Artificial Intelligence, robotisation and the multitude of smart analytics sensors offer exponential competitive advantages. More and more AI components are also being used in Romania, but most often they are imported up to date, at high cost and not giving access to the inside of the technology, but only for use. This makes it very difficult to research, develop or adapt many smart technologies, local/private needs. Through the South-East Artificial Intelligence Centre, building on a core of specialists in innovation, artificial intelligence and technology development/products with proven international experience, our project proposal supports several categories of (young) entrepreneurs interested in benefiting from the use of these smart components tailored to local and regional needs.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	Study on the optimal area of the SE for the main working centre (land, office building, mini-laboratory) Preparatory study and development of workspaces (mini-laboratory infrastructure, office infrastructure, experimental field infrastructure) Study and development of project-specific software hardware infrastructure

		Study, selection, design of vision/Sensing systems for generic and adaptive monitoring to the different needs identified Study and development of procurement components useful analysis parameters, with a special focus on education and health Study and development of personalised education components
	Complementarity with other projects	—
	Duration of the project	48 months
	Key outputs	Selection of land from available premises or acquisition of new land, linked to the interests of all partners. Infrastructure Implementation Plan Document. Development/implementation of work infrastructure. Implement software hardware infrastructure. Implement vision/Sensing generic, multifunctional monitoring. Acquisition of analytical parameters (e.g. vital, emotional, concentration, fatigue, stress, time spent, posture, environmental parameters, etc.). Development of smart education games and toys. Personal Interests Assistant.
	Status of the project	This is a complex project, a sum of several components. The maturity of the project idea depends on the maturity of its components. In our case, in terms of TRL maturity, it varies between TRL2 and TRL9 depending on the components.
	Risks	Administrative risks, bureaucracy
3.	**Title of the project**	**Mitigation of impacts and adaptation to climate change through a ULL (Urban Living Lab)**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Edward Bratfanos — edward.bratfanof@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Reference marks: • The company turns to a peer-to-peer company • Citizens become new decision-makers • Style people should produce acquaintances for citizens • Citizens' style is needed to make the sustainable transition a place. Society is becoming a peer-to-peer company, characterised by a new way of making things, from software to food, to cities, to scientific knowledge. This required a new role for the style. Instead of focusing on the production of knowledge for NGOs, authorities and the private environment, researchers are aware that the citizen will be the new decision-maker in a future peer-to-peer society (p2p) and will produce adequate and accessible knowledge with knowledgeable people. The aim is to find and involve innovators between stakeholders in an online and offline transfer to ensure smart, sustainable and inclusive growth. We meet our wishes in two ways: by connecting and empowering innovators in inclusive and sustainable development — and, secondly, by creating an ecosystem in which innovation can flourish. We support the idea, facilitate innovation, show success, monitor trends, build and facilitate an online and offline community. We used four tools:civic power, inclusiveness, new forms of cooperation and innovative use of data. The future off-line location of activities will be: • a common working space for conscientious people and active stakeholers, • a place to exchange ideas and debates on sustainable development, • a meeting point for active groups of citizens,

		• a place where knowledge is created and communicated. Citizens come, exchange ideas, inspire and develop ideas for the sustainable development of the municipality and county. Behave like part of the local and area environment.
	Project justification: needs identified in the region/county/municipality	Identify and involve innovators in an online and offline transfer to ensure smart, sustainable and inclusive growth.
	Nature of State aid	—
	Main activities of the project	GameUP! Developing entrepreneurship by studying and experimenting with various scenarios for start up and developing own businesses. Shadow — Youth involvement in decision-making by authorities on matters of general interest Invi — Creation of a culture in which social or sexual violence is rejected and equality of rights is encroached About the future — explores, anticipates and interprets changes in the future so that stakeholders are aware, resilient and flexible in relation to them (setting up and developing an online platform for learning and debate) Exclusion Radar — Developing effective solutions to identify and empower people with disabilities Activism — Citizens' Initiative — providing inspiration and energy Dialogues — the initiation and development of dialogue between representatives of the public environment and representatives of the private environment for the development of civic space (establishment and development of an online platform for debates) Effectiveness — Analysis of the efficiency of the use of natural, human and material resources (Efficiency Laboratories) Marginal — Promoting the inclusion of disadvantaged groups Ilicito — Involvement of civil society in the fight against organised crime Awards — Organisation of laboratories and award of prizes for the best innovative humanitarian and civic space development initiatives
	Complementarity with other projects	—
	Duration of the project	36 months
	Key outputs	Inclusive and sustainable development by creating a more active, involved, more united and better adapted community to change Increase citizens' involvement in decision-making on issues of common interest Increasing innovation in the areas of:economic and social
	Status of the project	—
	Risks	—
4.	**Title of the project**	**Supporting participatory processes in urban and territorial planning for sustainable regional development**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Mădălina Sbarcea — madalina.sbarcea@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Increase the capacity of public authorities to implement real participatory processes (at different scales, from micro to urban or regional, involving various stakeholders) and mitigate environmental conflicts. Implement new methods to support a participatory planning environment.

		Increase the degree of compatibility between the provisions of the plans for development and management of the territory and the perceptions/needs of local populations. Increase the number of citizens' initiatives for the sustainable development of the urban environment and/or the management of territorial resources.
	Project justification: needs identified in the region/county/municipality	A bottom-up approach in popularity in spatial planning is the use of "secular" knowledge to support decision-making on spatial management and sustainable development policies, as evidenced by participatory processes. It can be said that it is becoming increasingly important to incorporate, in addition to expert arguments, the views and perceptions of local communities, rooted in local experience, in the development of urban and regional development plans, programmes and policies. In this way, diverging concepts of sustainable development could be reconciled, as many environmental disputes are based on the response of the population to environmental policies that do not resonate with traditional socio-ecological practices or local perceptions. InLaw No 350/2001, the concept of participatory planning (with the involvement of the population and the various stakeholders) was introduced by Ordinance No 27/2008, when it became mandatory that all planning documents undergo a public information and consultation phase, and the methodology for the application of this provision was published in 2011.However, public information and consultation processes are often still formal and poorly productive. Problems identified in practice: the information is not sufficiently visible, the timing of the involvement of populations in the documentation process is inadequate (either too early or too late);public administrations lack the tools and knowledge to support participatory procedures; local communities do not always perceive the importance of their involvement. Good practices in urban and territorial planning have highlighted the importance of involving local communities in different phases of local and regional development projects. Sustainable governance of an area requires a balanced approach between top-down and bottom-up initiatives, and the citizens' initiative can transform the image of the urban environment, increase the sense of acceptance and ownership of an intervention, and support general well-being.
	Nature of State aid	—
	Main activities of the project	Transfer of knowledge from previous studies and best practices to public authorities in order to develop real participatory processes for integrating the preferences and views of local communities into local development plans (urban and spatial planning plans, development strategies, sustainable urban mobility plan, DDBR management plan, etc.) Develop new methodologies for the targeted region by using gaming theory elements to increase citizen motivation or Geographical Information Systems with Public Participation (SIGPP) for participatory mapping and collection of spatial data on public perception, which can be superseded over "classical" GIS layers in community-based mapping Testing the viability of these methods and the response of the population by applying to a representative sample. Raising awareness of the importance of involving local communities in decision-making processes and research projects (citizen science) and encouraging grassroots initiatives Integration of the concept of sustainable governance into the adaptive management of protected areas

	Complementarity with other projects	—
	Duration of the project	24 months
	Key outputs	Making public involvement in spatial planning processes more effective by implementing new participatory methods and procedures at local and regional level. Citizen's guide on how to participate in decision-making processes for urban and regional development. Application for Ilustration of options and preferences of the local population (maps with software GIS layers) to check compatibility with the provisions of the plans in force and to integrate into the plans being developed or updated.
	Status of the project	—
	Risks	—
5.	**Title of the project**	**Map of the energy efficiency of buildings in the ITI area and support for the transition to nZEB**
	Project Proposant	Danube Delta National Institute for Research and Development
	Contact details	Mădălina Sbarcea — madalina.sbarcea@ddni.ro
	Location of the project	Tulcea
	Objectives of the project	Improving the quality of the built environment in the ITI region, in particular increasing the energy performance of buildings; Increasing competences in the design/execution of buildings in line with the sustainability criteria of the built environment; Increase awareness of the use of buildings for energy efficiency purposes.
	Project justification: needs identified in the region/county/municipality	Alignment with European and national directives on energy efficiency in buildings; complementing knowledge of the energy performance of buildings in the ITI region;the creation of an energy art visualisation tool (energy map) accessible online to the general public to support decision-making in the real estate sector; supporting the transition to the nZEB (nearly zero Energy buildings) concept
	Nature of State aid	—
	Main activities of the project	The creation of a GIS database containing all attributes of the energy performance of buildings that have been energy certified/audited in the ITI area; The creation of a web energy map, based on the data collected, in support of municipalities and the general public, which offers the opportunity to identify vulnerable areas in which energy renovation must be prioritised, as well as to compare buildings for informed decisions in the building sector; Energy auditing of a number of public buildings — to complement the regional/national inventory, with results from which new rehabilitation projects can be developed; Recommendations for the energy efficiency of existing buildings, at nZEB level, based on the existing situation identified by the energy map — with a section dedicated to the use of ecosystem services by incorporating nature-based solutions — in line with internationally recognised standards such as PassivHaus or EnerPhit; Develop trainings for civil servants and professionals (architects, engineers, site managers, builders) in order to increase competence for the design/assessment/contracting/execution/use of nZEB (nearly zero-energy) buildings — in line with Directive 2010/31/EU on the energy performance of buildings
	Complementarity with other projects	—
	Duration of the project	24 months
	Key outputs	Interactive energy efficiency map at the level of the ITI region;

		Action plan to increase the energy performance of the built environment in the ITI area; 50 professionals and civil servants trained according to international standards for the construction/licensing of nZEB buildings.
	Status of the project	—
	Risks	—
6.	**Title of the project**	CiTyInnoHub — Centre for Digital Innovation
	Project Proposant	Ovidius University in Constanta
	Contact details	alexandru.bobe@365.univ-ovidius.ro
	Location of the project	Constanta
	Objectives of the project	The general objectives: 1.Identifying, co-interested and supporting inventors, innovators and innovators and start-ups and start-ups, who develop new, innovative digital technologies, with the general aim of participating in the activity of transferring knowledge and transfer of knowledge; 2.The development of economic partnerships and informed economic partnerships, with active and active actors in the field of interest of the IGC; 3.Ensuring and facilitating the transfer of know-how and cooperation in the field of digitalisation, research/development/innovation activities, academia, local business and regional business and the public sector; 4.Supporting the business environment, the public sector and local R & D & I by offering consultancy services and training to prepare the successful commercialisation of their own digital innovations or products/services and the introduction of new indigenous digital technologies; 5.Supporting private and public innovators, with R & D & I results in IT & C, for internationalisation: adapting the business/promotion/commerce of results to exit the global market; 6.Increase the portfolio of projects and clients by developing the offer of advisory services to access private funds (*venture capital*, *angel investors*) or non-repayable funds (European or private) and support project implementation. Specific objectives: **1. pre-investment testing** (Digital **evaluation and audit, assistance with digitisation of economic operators, verification of pilot digitisation plans, assistance and advice for experimental models and prototypes, access to equipment and infrastructure dedicated to testing and experimentation);** **2. training and support in acquiring digital skills** (Support to advanced digital skills — e.g. by coordinating with education providers for the provision of short-term training for workers and traineeships for students);

		4. support for investment identification (Support to companies, in particular SMEs and start-ups, [...] through services such as: Access to financial institutions and investors, support the use of *InvestEU* and other relevant financing mechanisms); (**5**) **Creating an innovation and network ecosystem** (Facilitating to bring together industry, businesses and administrations that need new technological solutions on the one hand, with companies, in particular start-ups and SMEs, which have market-ready solutions on the other).
	Project justification: needs identified in the region/county/municipality	CiTyInnoHub is a Digital Innovation Hub, composed of a group of partner organisations with complementary specialisation areas, whose mission is to provide technological expertise and experimentation facilities to European standards, with the aim of digital transformation of economic operators and public entities in the Romanian SE region.

As indicated in the Strategy for Intelligent Specialisation of the South-East Development Region, the identification of priorities at the level of the South-East Development Region was carried out through a process of detailed analysis of the activities previously undertaken in the process of establishing priority areas for smart specialisation in the region. In the context of the overall objective of the strategy, several strategic priorities have been defined to support its implementation through specific, concrete and achievable objectives. The cross-cutting priority, which serves all the listed strategic priorities, is to support the deployment of information and communication technology (ICT) across smart specialisation areas. It is impossible to develop an organisation and thus a region or country without the use of innovation and digitalisation. In this context, the smart specialisation of a region is dependent on ICT, regardless of the identified area of smart specialisation.

The digital innovation hubs in the S-E region will become a vital entity to ensure the direct link between the academic area and R & D & I and SMEs by identifying the digitisation needs of companies so that they are competitive in the medium and long term, internally and externally.

This requires a very good understanding of the current market, both international, national and regional.At international level, data on the location of Romania in the context of digital performance — DESI 2020 and R & D respectively are relevant.

According to the European Innovation Scoreboard 2019, Romania ranks in the category of modest innovators, with a declining performance compared to the EU average, following a steady downward trend. Digital Innovation Centres welcome two of our country's weakest indicators compared to the rest of the EU: number of innovators (human resources and innovative SMEs) and investment by firms in innovation. The CIDIs pave the way for the growth of these indicators, providing the infrastructure needed to develop and specialise human resources and facilitating the connection between innovators and firms open to digitalisation.The study also reveals the very good potential for the export of high-tech products, an increase above the EU average of Very High Speed Internet and high private co-financing compared to public funding. This latter detail reinforces the conclusion on opening up the private environment for investments in digitalisation. |

Unfortunately, exports of high-tech products in 2018 recorded a level of 8.4 % of total exports, slightly up from 2017, but below 50 % of the European average (17.9 %), according to Eurostat data.

In order to obtain an overview of the economic sector of the region, particularly in the light of the needs for innovation and digitalisation, the data available at the level of Constant County were analysed, with Preca rea s — at the level of the SE region. From the information received from the Chamber of Commerce, Industry, Navigation and Agriculture (CCINA) Constant has shown that there were 68 firms with a turnover of almost EUR 10 s 2019 million in Constant County, and there were 29 companies with a turnover of almost EUR 20 s 20 million, and a total value of more than EUR 929 million. Of the total number of companies in the county of Constant, there are clearly more than 26.000 firms active in the field of smart land specialisation. The largest number of firms are services (10.355), trade (7.869), tourism (2.555), construction (2.141), industry (2.085), agriculture and fisheries (1.084).Advanced technologies are the highest in many (520) and NSA's are the most competitive ones with a potential for higher future growth.

According to the information provided by the local authorities of the municipality and county of Constanța, the Harbour of Constanța is a point of strategic economic interest and is located on the routes of 3 pan-European transport corridors, IV, IX s — and VII.Other maritime transport operations on the Dunube — Black Sea Canal, the operation of the port's port and logistics, the construction of ships and tourism, the regional region notes the nuclear and wind energy efficiency, the extraction of hydrocarbons and the refining and processing of their chemicals, agriculture and the food industry.Various strong industries and other areas of the South East 2 Region are added to them.

Tourism firms, hospitals and private clinics (Laser Vision Med, Pozimed s -Isis, at local level, MedLife s — and Regina Maria, at the national level) are interested in using a variety of applications for mobile services and data analysis. Companies in the food industry (Argus, Heineken, Dobrogea), ship antibodies, logistics firms (CHIMPEX, Americopa), innovative equipment manufacturing firms (MicroPlasma, EcoHornet, StepProject, etc.) have expressed their interest in becoming more competitive by applying smart manufacturing strategies.

I Furthermore, the discussion with the representatives of firms, associated with the employers of chambers of commerce, revealed the need for information events and the presentation of technical solutions, training in areas related to entrepreneurship and business management, the reception of business development consultants and the development of business development, the training of staff in IT on niche domains, the development of local technologies, and the development of a new business adviser.

The reality of the large gap between Constant and the municipality of Constant, as an exponent of the Region 2 South-East, and the metropolitan areas of the other regions of Latvia (Bucharest, Cluj-Napoca, Iasi, Timisoara, Brasov) in the other regions of the region, means that the investment of the Digital Innovation Centre will lead to a significantly higher return on this area.

The analysis of the market in the region and the development potential of the sectors defined as strategic for the South-East region have demonstrated the need

for sustainable development based on the introduction and use in the economy of innovative digital products/services/processes with increased added value, which make it possible to align our region with the more developed European regions over time. As indicated above, although the need for economic progress and development is evident and the research — innovation — digitalisation sector can offer development tools, there is a large gap in investment in this sector and in attracting staff with high training.

The demonstrated potential of the market and the increased need to increase the economic competitiveness of those operating in the economy lead to a single conclusion: the need for additional investments in digitalisation and innovation, as an essential condition for the alignment of firms and economic sectors with those of foreign competitors, a condition that the state is dependent on the consumer market and the patrol as a player on the European and world markets by adding value to the products and services launched on the market.

In order to identify the needs of DIH beneficiaries, the Centre's members carried out a "Needs Analysis of the Development of Innovation and Digital Transformation in the South East Region" annexed to the application. Only the essential elements and conclusions of that analysis are set out below.

The first step in identifying the needs of CiTyInnoHub beneficiaries is the specification of the target group, building on the four strands of the mission undertaken by the Digital Innovation Hub:
1.The provision of digital transformation services and the provision of testing and experimentation facilities;
2.Training and support in the acquisition of digital skills;
3.Facilitating access to finance and investment;
4.Creating an innovation ecosystem.
The target groups that DIH envisages are made up of the following categories of entities:
- local, regional and Black Sea Basin universities (as potential knowledge generators and service providers for all 4 types of activities)
- research institutes, centres and resorts in the SE Region (as potential knowledge generators and providers of consultancy and technology transfer services);
- economic operators with modern digitalisation expertise or solutions (as providers of digital transformation services)
- public or private economic operators, large firms or SMEs, wishing to offer innovative products and services or to increase their productivity and competitiveness (as beneficiaries);
- local public authorities, agencies and public entities in the South-East region, interested in increasing the quality of the services provided to the efficiency of the work carried out (as beneficiaries);
- non-governmental organisations wishing to adopt the digital transformation in order to increase the quality of their services and the efficiency of operations (as beneficiaries);
- regional and local clusters, business associations, chambers of commerce, interested in creating an innovation ecosystem, increasing regional economic competitiveness and the quality of public services (bringing together both bidders and beneficiaries).

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- business support structures (incubators, accelerators, training centres, entities involved in running programmes, etc.)

Following the analysis of the regional market for innovation and technology transfer and discussions with public and private actors, some guidelines on services to be offered by DIH have been identified. These services can be highlighted according to the type of services and the corresponding recipient as follows.

The provision of digital transformation services has as potential beneficiaries a broad spectrum of public and private entities that want to increase their productivity by adopting new digital technologies. More efficient activity, whether public or private, requires the use of company resource planning systems (ERP), logistics management (WMS) or customer relations, sales and service (CRM), etc. In addition, repetitive tasks can be performed using robotic process automation (RPA) applications and the analysis and extraction of information from large databases can assist in making appropriate decisions, be it economic operators or public institutions. Furthermore, entities vulnerable to cyber-attacks require knowledge-transfer/advisory services to improve the security of their information systems and firms wishing to increase their customer pool may be interested in web-advertising and e-commerce.

The provision of testing and experimentation facilities is a desire of innovative firms wishing to introduce new products or services into the economic circuit. They require advisory services in the generation of ideas, knowledge transfer in various fields of smart specialisation, testing and piloting of these ideas.

Auditing, diagnostics and specialist technical advice and technology transfer services to improve manufacturing processes require larger firms that want to become more competitive by applying smart manufacturing strategies. These economic operators want to use modern computer-aided design techniques, automation using artificial intelligence systems, increasing the quality of maintenance services using augmented reality, energy saving using efficient heating and lighting technologies, etc.

Training and support in acquiring digital skills is demanded by a wide range of beneficiaries, from public and private entities to the general public. The subjects are very diverse as well as the level of expertise envisaged. Initiation requires general, introductory information courses in the use of modern computers and communication devices. Users of new technologies need to be trained in the use of the respective applications (ERP, WMS, CRM, etc.) and advanced users need highly specialised training courses of the highest standards on highly topical issues (artificial intelligence, cybersecurity, blockchain technologies, virtual and augmented reality techniques, high-performance computing, techniques for analysing and retrieving information from databases, robotic process automation methods, etc.).In addition to classical training courses, technological awareness and information campaigns, technological demonstrations, seminars/webinars, etc. are also required.

Facilitating access to finance and investment is a fundamental desire common to all potential beneficiaries of the Centre, be it private or public. The services requested relate to economic and financial diagnosis, based on the assessment of the business model, the assessment of the market and business opportunities, the financial

viability of the proposed model, the analysis of the level of investment readiness. The next step is entrepreneurial/managerial advice for the development of feasibility studies, market research, innovation management, specialist mentoring, advice on and protection of intellectual property rights, the creation of innovative spin-offs and start-ups, the recruitment of qualified personnel, etc. Finally, the service most frequently requested is to facilitate relations with financial institutions and investors and in particular support the use of different financing mechanisms, preparation of the offer, organisation of bidding events, etc.

The creation of an innovation ecosystem is an underunderstood need, which is not very explicit than by few potential beneficiaries. The formation of a regional Digital Innovation Community by building a critical mass of experts capable of providing complex services with technical, entrepreneurial, financial, legal, etc. expertise, as well as the construction of an appropriate infrastructure with high-performing equipment, is perceived as a clear necessity.

On the other hand, the creation of an innovation culture to stimulate entrepreneurship is better understood by representatives of employers' associations, chambers of commerce, clusters. For them the formation of a national Digital Innovation Community is also important for them, I propose to set up a network of Digital Innovation Hubs to facilitate the inter-regional flow of information and best practices, the organisation of national events, etc. Moreover, the need for integration into the European Digital Innovation Community is also appreciated. Membership of the network of European Digital Innovation Hubs, specific participation in, and co-running of, thematic clusters or platforms can help to open up new opportunities for beneficiary firms to internationalise, thereby increasing their client base and turnover.

In conclusion, the needs analysis led to two major directions: the development of innovative information and communication technology (ICT) products/services/applications in support of SMEs and public authorities, and ii) non-repayable financial support for the digitisation of micro, small and medium-sized enterprises in sectors other than ICT.Details of the analysis can be found in the document "Analysis of the needs for the development of Innovation and Digital Transformation in Southeast Region" carried out for the purpose of establishing this DIH.

	Nature of State aid	Nonrefundable funds
	Main activities of the project	Training and support in the acquisition of digital skills
		Provision of digital transformation services and provision of testing and experimentation facilities
		Facilitating access to finance and investment
		Creating a digital innovation ecosystem
	Complementarity with other projects	—
	Duration of the project	84 months
	Key outputs	—
	Status of the project	Started
	Risks	—
7.	**Title of the project**	**DanubeDIH — Increasing the transition capacity of enterprises in the South-East Region towards digital innovation through technological endowment, digitalisation and IT security for a knowledge-based regional economy through dedicated support structures**

	Project Proposant	"Clusterul IT&C Dunarea de Jos" Galati
	Contact details	alinaraileanu@univ-danubius.ro
	Location of the project	Galati
	Objectives of the project	General objective: Providing the logistical framework for digital innovation by developing and equipping a Hub for local and county businesses and public administrations at the level of the South-East Region Specific objectives: Enhancing ICT research in higher education institutions that are members of the partnership. Providing research logistics, testing through the expansion of the office building and the development of testing laboratories for innovations in the field of ICT and cybersecurity in particular
	Project justification: needs identified in the region/county/municipality	Identified needs: Low capacity at local and regional level to implement ICT innovation in enterprises and public institutions. - Lack of basis for the transition to a regional knowledge-based economy through technological endowment and digitalisation of enterprises, increased economic cooperation and increased contribution from R & D & I to the economic development of the Region. - Lack of up-to-date analysis of constraints in the diffusion of innovation, including digitalisation. The Strategy for Smart Specialisation of the South East Region mentions digitalisation as a horizontal area of involvement both in traditional sectors (textiles, cars, wood and furniture, etc.) and in horizontal sectors (bioeconomy, creative and cultural, etc.). - Although the regional university offer in the field of IT is rather generous, in terms of specialisations, and it can be considered that it is intended to feed the development of the sector, from the perspective of the workforce, a very small number of graduates remain in the Region, and there is no real synergy between education and manufacturing sectors. - The need to develop a digital innovation hub dedicated to the economy and public administration in the South East Region
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1.Expanding and equipping DanubeDIH space 2. procurement of digital tools, procurement of services and equipment necessary for the digital transformation 3.Investments for the deployment of cybersecurity solutions 4.Cybersecurity advice and support 5.Provision of services to SMEs: a) training and support in the acquisition of digital skills pre-investment testing c) support for identification of investments (d) classification in an innovation and networking ecosystem e) Access to expertise in the field of digital transformation and know-how, including CDI facilities (media laboratories, robotics) 6.Information, publicity and sales consultancy measures offered to businesses through business incubation, networking, support for investment and training of employees through European and national funding.
	Complementarity with other projects	—
	Duration of the project	36 months

	Key outputs	—
	Status of the project	Started
	Risks	—
8.	**Title of the project**	**Development of the package of services offered by the Galați Science and Technology Park — Galați Information Technology Park through the endowment of an office building and testing facilities for new ICT technologies to ensure the transition of the local economy towards a knowledge-based, research, development, innovation.**
	Project Proposant	Galați City Hall
	Contact details	cristi.ochiu@primariagalati.ro
	Location of the project	Galati
	Objectives of the project	General objective: • Planning and equipping of office areas with last-generation equipment and services for companies in the field of ICT and digital security Specific objectives: • Provision of tailored services to companies in various fields of activity, pre-empting those identified by the smart development strategy of the Region • Implementation of green technologies to achieve lower consumption through the use of renewable energies. • Ensuring information, advertising and advisory services to businesses through business incubation, networking, support for investment and training of employees through European and national funding, transfer of know-how • establishing and expanding partnerships between public administration academia, business and civil society
	Project justification: needs identified in the region/county/municipality	Need identified: • digitalization and security of the services offered by the Public Administration to businesses. • greater involvement in the transition of companies to a knowledge-based economy through technological endowment and digitalisation, increased economic cooperation and increased contribution from R & D and innovation to local economic development. • The need to strengthen the capacity to develop the high-tech industrial sector, to facilitate technology transfer and to create a viable alternative to the labour market through the structures of which the Local Council is a founding member, in particular by enhancing the services offered by the Science and Technology Park — Parc De Soft Galați • the provision of the services described above, in an architectural package equipped with state-of-the-art IT technology, high speed internet, secure IT infrastructure.
	Nature of State aid	Nonrefundable funds
	Main activities of the project	1. analysis of the concrete IT needs of companies in the South East Region. 2. study on the feasibility of retrofitting and extension works of the identified building 3. construction works for the suitability of the existing building to the identified needs of potential customers. Furnishment and equipment for the office areas with state-of-the-art equipment and services for companies in the field of ICT and digital security 4. information, publicity and consultation measures offered to businesses through business incubation, networking, support for investment and training of employees through European and national funding, transfer of know-how

	Complementarity with other projects	—
	Duration of the project	30 months
	Key outputs	—
	Status of the project	Started
	Risks	—

Annex 2.Resources needed

Engineering and Shipping				
Ref. no	Title of the project	Project Proposant	Budget (EURO)	Budget (LEI)
1.	Improving the practical training of shipping personnel by digital means	CERONAV — Romanian Centre for Preparation and Training of Personnel in Maritime Transport Mihaela Vintilă mihaelavintila@ceronav.ro	1.000.000	4.900.000
2.	Deployment of innovative technologies in land monitoring and bathymetric determinations in port areas to control and reduce mooring infrastructure in maritime Danube harbours.	UPIR — Union of Romanian Intern Harbours Carmen Mariana Costache office@danube-ports.ro	4.000.000	20.000.000
3.	SMART DANUBE HARBOURS	UPIR — Union of Romanian Intern Harbours Carmen Mariana Costache office@danube-ports.ro	4.500.000	22.500.000
4.	DANUBIUS-RI:The International Centre for Advanced Studies on River-Sea Systems	GeoEcoMar-INSB-INCDDD Astanica@geoecomar.ro; manuelasidoroff@yahoo.com; office@ddni.ro	20.000.000	100.000.000
5.	Energy AND ENVIRONMENT — Making the best use of conventional and unconventional water resources	Iulian NICHERSU — iulian.nichersu@ddni.ro	8.000.000	
6.	Solutions for the use of unconventional energy (solara, wind) to supply the municipalities of the DDBR.	Danube Delta National Institute for Research and Development Matei Simionov — matei.simionov@ddni.ro	800.000	
7.	Security Operation Center Naval Fluvial	Dunarea de Jos Galati University		
8.	Digitalisation of technical and communication parameters for propelled vessels Digital system for monitoring propelled vessels to make inland waterway transport more efficient	CNFR NAVROM SA 1.Șerban Cucu — office@aaopf.ro — O 2.Ioan Bosoancă — diagnose.group@yahoo.com — E 3.Camelia Palagă — ccia@cciagl.ro — P 4.Veronica Gheorghița — programe@portal-brăila.ro — P 5.Sorina Păcuraru — sorina.pacuraru@ugal.ro — C	Not mentioned	
9.	Ecosystem-based adaptationsolutions and models for coastal zone management in	Danube Delta National Institute for Research and Development	8.000.000	38.998.977

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	the DDBR — Sulina-Sf area.Gheorghe-Arm			
10.	DELTALIFTER Innovative system for the lifting and transport to the land of off-shore metal structures (marine decommiting tool) and support for firm construction of marine windmills	ICEPRONAV Engineering SRL, Galati, Romania/Norwegian company Deltalifter Technologies AS and University of Galati.	2.500.000	-
11.	Innovative Concept Design of Multi-Sectoral Platform Vessel for Offshore Operations	ICEPRONAV Engineering SRL, Galati, Romania, a naval yard from the South East Region and the Dunarea de Jos University, Galati.	2.500.000	-

Clothing Industry				
Ref. no	Title of the project	Project Proposant	Budget (EURO)	Budget (LEI)
1.	Digital skills in wearing textiles	National Institute of Research for Textiles and Leather Bucharest Olaru Sabina sabina.olaru@incdtp.ro	750.000	3.650.000
2.	Development of technical textiles carried out in the South East Region	Romanian Textile Concept Cluster Minela Neneciu office@romanian-textile.ro	6.000.000	30.000.000
3.	Development of smart textiles	Romanian Textile Concept Cluster Minela Neneciu office@romanian-textile.ro	5.000.000	25.000.000
4.	Recovery of textile waste from the production process through innovative processing techniques/methods.	Romanian Textile Concept Cluster Minela Neneciu office@romanian-textile.ro	5.000.000	25.000.000
5.	Developing advanced technologies for innovative clothing	Romanian Textile Concept Cluster Minela Neneciu office@romanian-textile.ro	1.000.000	5.000.000
6.	Integrating the digitalisation of flows, procurement of consultancy programmes	SC Simiz fashion SRL	1.500.000	7.312.308

Aquaculture and fisheries				
Ref. no	Title of the project	Project Proposant	Budget (EURO)	Budget (LEI)
1.	"National Research Centre for Biology, Conservation, Artificial Reproduction and Harveting of	Galați Institute for Development in Aquatic Ecology, Fisheries and Aquaculture ICDEAPA Galati	4.000.000	20.000.000

	living aquatic resources" — BIOACVATEH		
2.	Strategy for the conservation of fisheries resources in the DDBR	Danube Delta National Institute for Research and Development

Aurel Năstase — aurel.nastase@ddi.ro | 4.150.00 | |
| 3. | Integrated Monitoring System — Implementation and Maintenance of Equipment Tracking and UAV for Site System Information — SIMDD | Danube Delta National Institute for Research and Development

Cristian Trifanov — cristian.trifanov@ddni.ro | 4.000.000 | |
| 4. | Assessment of ecosystem services in the context of continuous modelling of the natural framework and biodiversity specific to the Danube Delta Biosphere Reserve | Danube Delta National Institute for Research and Development

Gabriel Lupu — gabriel.lupu@ddni.ro | 2.500.00 | |
| 5. | Ecological reconstruction work for Lake Fortuna from the Șontea-Fortuna aquatic complex | Danube Delta National Institute for Research and Development
Paula PINDIC, Ciprian ANORE, Alexandru BĂNESCU
paula.pindic@ddni.ro, ciprian.anore@ddni.ro, alexandru.banescu@ddni.ro | 13.000.000 | |
| 6. | Ecological reconstruction work for Lake Sitlina, from the Gorgova-Plant Aquatic Complex | Danube Delta National Institute for Research and Development
Paula PINDIC, Ciprian ANORE, Alexandru BĂNESCU
paula.pindic@ddni.ro, ciprian.anore@ddni.ro, alexandru.banescu@ddni.ro | 9.000.000 | |
| 7. | Identifying seasonal changes in aquatic fauna using Edna as a tool to monitor biodiversity in the Danube Delta | Danube Delta National Institute for Research and Development

Daniela Nicoleta Holostenco — daniela.holostenco@ddni.ro | 3.000.000 | |
| 8. | Evaluation of the success of actions to support the Danube with sturgeon chickens | Danube Delta National Institute for Research and Development

Marian Paraschiv — marian.paraschiv@ddni.ro | 2.500.000 | |
| 9. | Assessment of starches and characterisation of the genetic structure of populations of migratory fish that reproduce in the Lower Danube | Danube Delta National Institute for Research and Development

Marian Paraschiv — marian.paraschiv@ddni.ro | 5.000.000 | |
| 10. | Assessment of the toxicity of chemicals in the Danube Delta using Caenorhabditis elegans transgenic nematode | Danube Delta National Institute for Research and Development

Marius Circima — marius.circima@ddni.ro | 2.000.000 | |
| 11. | Development of a guide for the implementation of Agenda 2030 — SDG, in the territory of ITI Delta Danube | Danube Delta National Institute for Research and Development
Iulian Nichersu — iulian@nichersu @ ddni.ro | 1.500.000 | |
| 12. | Development of a "Mixed Reality" technology framework in | Danube Delta National Institute for Research and Development | 5.000.000 | |

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	VR/AR digital applications to save the architectural/cultural/natural heritage of the Danube Delta	Iulian Nichersu — iulian@nichersu @ ddni.ro		
13.	Increase research capacity on environmental behaviour of contaminants with emerging problems (ERC) and antimicrobial-resistant bacteria in aquatic ecosystems	Danube Delta National Institute for Research and Development Adrian Burada — adrian.burada@ddni.ro	8.500.00	
14.	Establishment of the strategy for the assessment and monitoring of environmental factors in order to classify water bodies in the DDBR according to their ecological status	Danube Delta National Institute for Research and Development Iuliana — Mihaela Tudor — mihaela.tudor@ddni.ro	3.000.000	
15.	Aquaculture technology park — Caraorman research base	Danube Delta National Institute for Research and Development Irina Cernisencu — irina.cernisencu@ddni.ro	4.000.000	
16.	Study on swimming behaviour of some fish species found in the territory of the DDBR	Danube Delta National Institute for Research and Development Stefan Hont — stefan.hont@ddni.ro	1.000.000	
17.	Native juvenile production station for restocking the Danube Delta (Maliuc — Lucerniera)	Danube Delta National Institute for Research and Development Irina Cernisencu — irina.cernisencu@ddni.ro	5.000.000	
18.	Research Centre for the Ecology of Wetlands and Emerging Transboundary Diseases (Maliuc)	Danube Delta National Institute for Research and Development Lucian Eugen Bolboacă — lucian.bolboaca@ddni.ro	3.000.000	
19.	Research centre for wetland ecology/ecological restoration and zoonotic diseases (Chilia Veche)	Danube Delta National Institute for Research and Development Spiridon Cosmin — cosmin.spiridon@ddni.ro	3.000.000	
20.	Native juvenile fish production station for restocking the Danube Delta (Enisala)	Danube Delta National Institute for Research and Development Irina Cernisencu — irina.cernisencu@ddni.ro	4.000.000	
21.	Hydrogeological studies to map the Danube Delta aquifer	Danube Delta National Institute for Research and Development Oliver Livanov, Iuliana Nichersu oliver.livanov@ddni.ro, iuliana.nichersu@ddni.ro	2.500.000	
22.	Research on underwater heritage in the ITI area	Danube Delta National Institute for Research and Development Cristian Trifanov — cristian.trifanov@ddni.ro	500.000	
23.	Assessment of the percentage of heavy metals contained in fish species of economic interest in the Danube Delta	Danube Delta National Institute for Research and Development Marian Paraschiv — marian.paraschiv@ddni.ro	3.000.000	
24	Danube Delta Centre for Advanced Research on Emerging Diseases, zoonoses and	Danube Delta National Institute for Research and Development Mihai Marinov — mihai.marinov@ddni.ro	10.000.000	

	Environmental Health (Enviro-Health-DD)			
25.	Restoring Ecologic of degraded/anthropogenic modified ecosystems in the DDBR by reconnecting them to the Danube hydrological regime	Danube Delta National Institute for Research and Development Marian Tudor — marian.tudor@ddni.ro	8.000.000	

Agro-food and biotechnologies				
Ref. no	Title of the project	Project Proposant	Budget (EURO)	Budget (LEI)
1.	Assessment of the bioenergy potential of student natural resources	Danube Delta National Institute for Research and Development	1.800.000	8.774.770
2.	Danube Delta Salbatic Animal Recovery and Rehabilitation Centre — Tulcea	Danube Delta National Institute for Research and Development	6.000.000	29.249.232
3.	Experimental field for research for the conservation/restoration of organic soils in wetlands	Danube Delta National Institute for Research and Development	3.000.000	14.624.616
4.	Use of biocompounds from by-products/plant waste in the formulation of functional food	University "Dunărea de Jos" Galați	1.500.000	7.312.308

Tourism				
Ref. no	Title of project	Project Applicant	Budget (EURO)	Budget (LEI)
1.	Integration of solutions supporting sustainable mobility in the area (friendly cycle facilities and services, electric cars, etc.)	Danube Delta National Institute for Research and Development	1.000.000	4.87.4872
2.	South-East tourism and health centre — integrated concept of medicine and tourism based on healthy lifestyle	IMMUNOMEDICA PROVITA SRL	10.000.000	48.748.772
3.	Cycling tourism infrastructure using new technologies in the SE region	Basarabii Association	5.000.000	24.370.944
4.	Danube Delta Cluster	National Institute for Research — Development of the Danube Delta (INCDDD)	1.500.000	7.312.308
5.	Murighiol, Balneo – climateric station	Danube Delta LAG Association		

6.	Promoting the concept of "Passive House" for accommodation in sustainable facilities in the ITI area	Danube Delta National Institute for Research and Development	1.000.000	4.87.4872
7.	Proposals to revitalise and refunction industrial heritage in the ITI region	Danube Delta National Institute for Research and Development	1.000.000	4.87.4872
8.	Nature-based solutions for adapting to climate change and increasing the quality of life in the urban environment	Danube Delta National Institute for Research and Development	500.000	
9.	Restoring the history of the Romanian authorities in Dobrogea using virtual and augmented reality technologies.	Dunarea de Jos University	900.000	4.381.560.00

Information and communication technology				
Ref. no	Title of the project	Project Proposant	Budget needed (EURO)	Budget needs (LEI)
1.	SMART Campus	Dunarea de Jos University	-	-
2.	South-East Artificial Intelligence Centre	CRAU	15 000 000	73.039.500
3.	Mitigation of impacts and adaptation to climate change through a ULL (Urban Living Lab)	Danube Delta National Institute for Research and Development		
4.	Supporting participatory processes in urban and territorial planning for sustainable regional development	Danube Delta National Institute for Research and Development	1.500.000	-
5.	Map of the energy efficiency of buildings in the ITI area and support for the transition to nZEB	Danube Delta National Institute for Research and Development	1.500.000	-
6.	CiTyInnoHub — Centre for Digital Innovation	Ovidius University in Constanta	-	150.417.893
7.	DanubeDIH — Increasing the transition capacity of enterprises in the South-East Region towards digital innovation through technological endowment, digitalisation and IT security for a knowledge-based regional economy through dedicated support structures	"Cluster IT & C Danube de Jos" Galati	7.000.000	-
8.	Development of the package of services offered by the Galați Science and Technology Park — Galați Information Technology	Galați City Hall	8.000.000	-

| Park through endowment of an office building and testing facilities for new ICT technologies to ensure the transition of the local economy towards a knowledge-based, research, development, innovation | | | |

Annex 3. Action Plan