OECD Territorial Reviews

Regional Policy for Greece Post-2020

REGIONAL PROFILES

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This document was co-ordinated by Stefano Barbieri, Senior Policy Analyst in the Regional Development and Tourism Division, under the supervision of Alain Dupeyras and Jose Enrique Garcilazo, Head and Deputy-head of the Regional Development and Tourism Division.

The document was prepared by the OECD (Stefano Barbieri and Paolo Rosso, Policy Analyst in the Trento Centre for local development) with George Petrakos, former Rector and professor at the Department of Planning and Regional Development, University of Thessaly.

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Abbreviations and acronyms

ALMP	Active Labour Market Policy
BOP	Balance of Payments
CA	Certifying Authority
CAP	EU Common Agricultural Policy
CF	Cohesion Fund
CFP	Common Fisheries Policy
CLLD	Community-Led Local Development
DAFNI	Sustainable Islands Network
DEMETRA	Organisation of Agricultural Vocational Education, Training and Employment
DG REGIO	European Commission Directorate-General for Regional and Urban Policy
DG REFORM	European Commission Directorate-General for Structural Reform Support
DWT	Deadweight Tonnage
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
ECB	European Central Bank
EDP	Entrepreneurial Discovery Process
EEA	European Economic Area
EIB	European Investment Bank
EIF	European Investment Fund
EKDDA	National Centre for Public Administration and Local Government
ELSTAT	Hellenic Statistical Authority
EMFF	European Maritime and Fisheries Fund
ENPE	Association of Regions of Greece
EPAnEK	Operational Program for Entrepreneurship, Competitiveness and Innovation
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Structural and Investments Funds
ETC	European Territorial Co-operation
EYSE	Special Service for the Implementation
EYSEKT	Special Service for the Co-ordination and Monitoring of ESF Actions
EYSSA	Special Service for Strategy, Planning and Evaluation
EYTHY	Special Service for Institutional Support
GNTO	Greek National Tourism Organisation
GVA	Gross Value-added
GVC	Global Value Chain
IB	Intermediary Body
ICT	Information and Communication Technology
IDIKA	National Social Security Service
IIS	Integrated Information System
IMF	International Monetary Fund
ITI	Integrated Territorial Investments
KEDE	Central Union of Municipalities of Greece
KEK	Vocational Training Centres

LAG	Local Action Group
LRAs	Local And Regional Authorities
LSP	Local Spatial Plan
MA	Managing Authority
MCS	Management and Control System
MIS	Special Service for the Monitoring Information System
MoEE	Ministry of the Environment and Energy
MoU	Memorandum of Understanding
MOU	Management Organisation Unit of Development Programs
MTFS	Medium-Term Fiscal Strategy Framework
NAS	Greek National Adaptation Strategy
NCA	National Co-ordination Authority
NDP	National Development Program
NGO	Non-Governmental Organisation
NSRF	National Strategic Reference Framework
NWMP	New National Waste Management Plan
OAED	Manpower Employment Organisation
OP	National and regional Operational Programs
PA	Partnership Agreement
PEDA	Regional Association of Municipalities of Attica
PIB	Public Investment Budget
PIP	Public Investment Program
PPP	Private Public Partnerships
PSKE	State Aid Information System
R&D	Research and Development
RAI	Regional Authority Index
RDP	Rural Development Program
RIA	Regulatory Impact Assessment
RIS3	Research and Innovation Strategy for Smart Specialisation
ROPs	Regional Operational Programs
RTI	Research, Technology and Innovation
SEO	Social Economy Organisation
SMEs	Small and Medium Enterprises
SSP	Special Spatial Plan
TiVA	Tourism Trade in Value Added
TO	EU Thematic Objectives
UNHCR	United Nations Refugee Agency
VAT	Value Added Tax
VET	Vocational Education and Training
YEI	Youth Employment Initiative
ZOE	Urbanisation Control Zones

Introduction

The Territorial Review "Regional policy for Greece post 2020" has been undertaken by the OECD in partnership with the Ministry of Development and Investments of Greece and DG-REFORM of the European Commission.

During the project, which lasted 2 years (October 2018-November 2020), the OECD has conducted desk analysis, web-seminars and interviews with relevant actors and stakeholders, and four one-week field visits to Greece (in November 2018 and January, April, September 2019) to make research interviews and collect information in order to inform the Territorial Review. Meetings were held with officials from all the 13 Greece's regions and from the central level, notably: regional governments and authorities, managing authorities of regional and national operational programs, academics, representatives of municipalities and business networks and associations, NGOs as well as the ministry of the economy and development, the ministry of the interior and all the relevant sectoral ministries.

In addition, in 2020 the OECD has conducted a regional survey based on a structured questionnaire. Selected public and private stakeholders from the public, private and academic sectors in each region were asked to express their views on the development problems and policy priorities of their territory. One hundred and eighty-six (186) institutions from all the regions answered the questionnaire, which was composed of five sections. In the first section respondents had to identify development challenges for the region and to rank development priorities. In the second section, respondents were asked to evaluate whether the thematic objectives of their Regional Operational Program (ROP) were directly related to and addressing the development problems of the region. In the third section, they were asked to express an opinion on whether the design and implementation of the ROP was satisfactory and identify challenges for the implementation. In the fourth section, respondents were asked to evaluate the expected benefits of the ROP on the region. Finally, in the fifth section they were asked to make suggestion to improve the impact of EU funds in the next 2021-2027 programming period.

On 1 October 2020, the OECD published the Territorial Review report: Regional policy for Greece post-2020[1], which examines the regional development, the EU Cohesion policy and the multilevel governance frameworks in Greece and offers policy guidance to strengthen Greece's regional development and well-being. The Review stresses that policies for economic growth, social capital and environmental sustainability are more effective when they recognise the different economic and social realities where people live and work. The report illustrates the importance to align place based regional development strategies with sectoral policies (support for private investment, infrastructure and human capital policies) in each place to generate multiplier effects.

This document, "Regional Policy for Greece post-2020: Regional profiles", complements the Review report offering a detailed socio-economic picture of each of the thirteen Greece's regions and a discussion of their development priorities and strategies for the years to come.

[1] https://www.oecd-ilibrary.org/urban-rural-and-regional-development/regional-policy-for-greece-post-2020_cedf09a5-en.

Greece's regions: overall view

Regional profiles, inequalities and challenges

The analysis of the regional structure of the Greek economy reveals persisting imbalances in terms of GDP per capita, population and welfare. The Greek economic space is dominated by the presence of the metropolitan area of Athens that is part of the Attica Region but functionally extends beyond its borders, embracing clusters of significant industrial activity located a short distance in the neighbouring regions.

Table 1 shows that Greece maintains significant regional inequalities that are related: (a) to the allocation of population and activities over space and (b) the differences in a number of significant development indicators. The Attica metropolitan region, which concentrates 36% of the population and 48% of the national GDP (more than 50% if one counts also satellite industrial establishments in the surrounding regions), has a GDP per capita that is 136% of the national average. It is also one of the largest and most densely populated cities in Europe with 990 inhabitants per sq. km, a figure that is 12 time higher than the national average. It has almost doubled its population, experiencing strong migration inflows in the 60s, 70s and 80s from the peripheral regions that contributed significantly to a strong and lasting growth, but also to the environmental and social problems of the metropolis.

Table 1. Basic regional indicators of Greece, TL2 level

Region	Population (2018)	Density (2018)	GDP regional share (2016)	GDP per capita (2016)		RIS, 2017 EU=102.5	RCI 2019 Value in the 0-100 scale and rank
				GR =100	EU = 100		
Greece	**10741165**	**81.4**	**100.0**	**100.0**	**59.2**		**23.53**
Attica	3,756,453	986.5	47.5	135.6	80.3	76.9	44.97 *(180)*
Central Greece	555,623	35.7	4.6	89.9	53.2	53.8	10.48 *(254)*
Central Macedonia	1,875,996	98.0	13.7	78.6	46.6	67.3	20.29 *(239)*
Crete	633,506	76.0	4.9	84.3	49.9	71.4	12.93 *(250)*
East Macedonia - Thrace	601,175	42.5	3.9	69.8	41.3	53.4	5.67 *(265)*
Epirus	334,337	36.3	2.2	72.0	42.6	54.3	11.64 *(251)*
Ionian Islands	204,562	88.7	1.8	92.7	54.9	42.9	10.15 *(256)*
North Aegean	211,137	55.0	1.4	74.9	44.3	54.6	0 *(268)*
Peloponnese	576,749	37.2	4.5	82.9	49.1	48.0	8.84 *(258)*
South Aegean	340,870	64.5	3.4	108.5	64.2	48.5	7.93 *(259)*
Thessaly	722,065	51.4	5.2	77.3	45.8	59.2	11.16 *(252)*
Western Greece	659,470	58.1	4.6	73.6	43.6	64.8	6.53 *(262)*
Western Macedonia	269,222	28.5	2.2	87.7	51.9	62.9	6.05 *(263)*

Note: OECD Territorial Level (TL) 2 regions correspond to Eurostat's NUTS2.
Source: ELSTAT (2018), Eurostat (2018), RCI (2019)

Central Macedonia in the north, which includes Thessaloniki, the second metropolitan region of Greece, has a significantly lower GDP per capita, equal to 77% of the national average. The regions with relatively higher GDP per capita are the island regions of South Aegean, Ionian and Crete (with 109%, 93% and 84% of the national average respectively), the region of Central Greece, hosting the satellite industrial areas of Attica (90% of national average) and the energy supplying region of Western Macedonia (87% of national average). The regions with the lower GDP per capita are the border region of Eastern Macedonia and Thrace and Epirus (70% and 72% of national average).

Although the region of Attica has a GDP per capita that is almost double than that of the weakest region of East Macedonia and Thrace, the most serious problem for balanced growth is not related so much to this development gap itself, but to the fact that the metropolitan region of Attica concentrates nearly half of the economic activity of the country. A combination of agglomeration economies, market size and capital status (all high-level administrative functions and 50% of public employees are located in Athens) exerts strong attraction forces to the rest of the country and does not leave enough room for growth to the smaller peripheral cities.

Most regions have a GDP per capita that is very low compared to the EU average. With the exception of Attica that is getting somehow close to the EU average (80%), the relatively more advanced island regions have a GDP per capita in the range of 50-60% of the EU average, while the relatively less advanced regions in northern and western Greece have GDP per capita figures in the range of 40-50% of the EU average.

Similar type of inequalities exist in terms of the innovative capacity of the regions, measured by the Regional Innovation (RIS) index. As R&D in Greece is mostly related to the public sector, the regions that host significant academic institutions and research centres tend to have higher RIS value. Attica has the highest value, which is around 75% of the EU average. It is followed by three regions with significant science base (Crete, Central Macedonia and Western Greece), but most other regions have low (in the 50+ range) or very low (40+ range) values, which is about half the EU average figure. The characteristic difference between RIS and GDP per capita is showed by the island regions that appear with relatively high GDP per capita figures because of mass tourism (South Aegean and Ionian) have the lowest figures in terms of innovative performance.

The last column of Table 1 presents the figures of Regional Competitiveness Index (RCI) for the Greek regions, which is measured by the EC (2019) as "…a measure of the ability of regions to offer an attractive and sustainable environment for firms and residents to live and work". The RCI Index is based on 74 indicators organized in 11 pillars measuring many aspects of the economic, institutional, social and policy environment at the regional level. The first observation is that inequalities among regions are significantly higher, as the figure of Attica is more than twice higher than that of Central Macedonia one (which is having the second highest figure) and about 4 times the figure of Crete, Epirus and Thessaly that follow. The gap with the remaining of the regions is even higher. The second observation is that the Greek regions (and Greece as a whole) have a very poor performance in this index. The metropolitan region of Attica is in the 180th place (among 268 TL2[2] regions) and is having actually the lowest figure from all metropolitan regions in Europe, except that of Bulgaria). The other regions have significantly lower positions and are very close to the bottom of the ranking (EC, 2019). It seems that inequalities appear to be much higher at both the national and European scale when measured by composite indicators. A similar Composite Index of Welfare and Development[3] estimated for TL2 and TL3[4] regions in Greece confirms this trend.

The figures identify two significant development gaps, an internal and an external one, related to two important policy challenges. The first challenge is to bridge the development, competitiveness and welfare

[2] For Greece OECD Territorial Level (TL) 2 regions correspond to Eurostat's NUTS2.

[3] Petrakos and Psycharis (2016a).

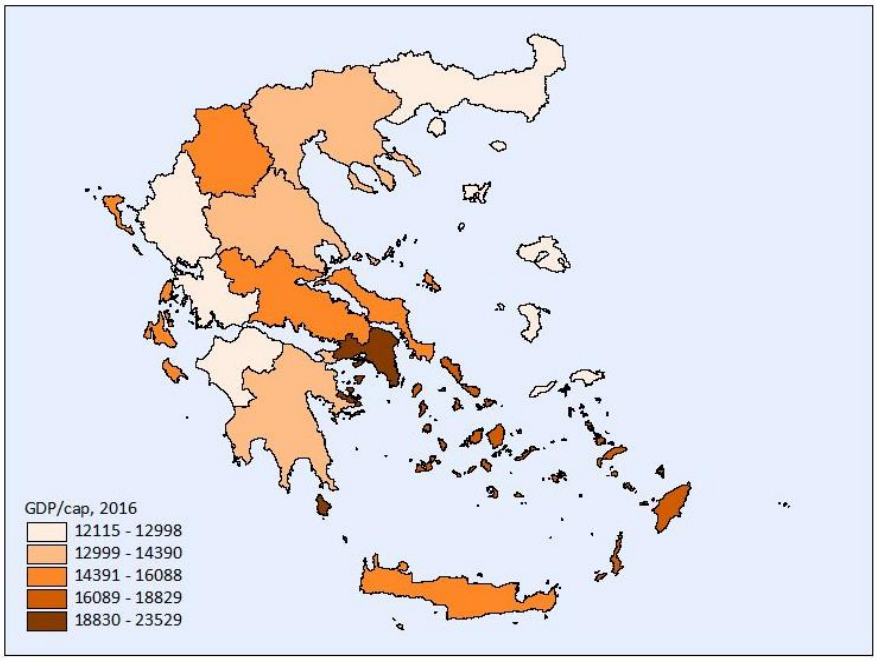
[4] For Greece OECD Territorial Level (TL) 2 regions correspond to Eurostat's NUTS2 and TL3 to NUTS3.

distance between the laggard regions and the metropolitan region of Attica. The second challenge, which is even more important, is to bridge the distance between the Greek regions and the EU average in terms of critical development and welfare indicators.

Figure 1 presents the differences in the development level among TL2 [5] regions. Besides the energy supply region of Western Macedonia, which appears with a modest level of development, but currently faces severe challenges related to its post-lignite strategy, the larger part of the border zone and the western part of Greece is characterized by low levels of development. On the other hand, Attica, its neighbouring region of Central Greece and the islands (except North Aegean) are characterized by a higher level of development. The arising pattern, where the metropolitan region (with its satellite extensions) and most islands have higher level of development, while most of the other mainland regions (especially in the northern borders and the west) have a lower level of development, depicts to a significant degree differences in the productive structure of the regions.

The metropolitan region of Athens has a productive structure that combines scale, externalities, variety and openness and a mix of tradable and sheltered activities that allowed it to reach its dominant position in the economy. The islands have developed a strong specialization in tourism, which relies on domestic and (mostly) international demand and have managed to take advantage of their unique physical, built and cultural environment. Some of them are top international destinations and have developed a relatively monoculture economy, while some others (especially Crete) have managed to connect to some extent tourism to the agro-food sector. In both cases, the driving force behind their success is mainly international tourism, which makes their performance conditional to external factors beyond national or regional control. On the other hand, most of the mainland regions face a number of constraints in their performance related to limited variety in their productive base, accessibility, scale and quality in production, missing infrastructure and services as well as structural difficulties to compete in the European markets.[6]

Figure 1. GDP per capita in the Greek TL2 II regions (€/inh), 2016



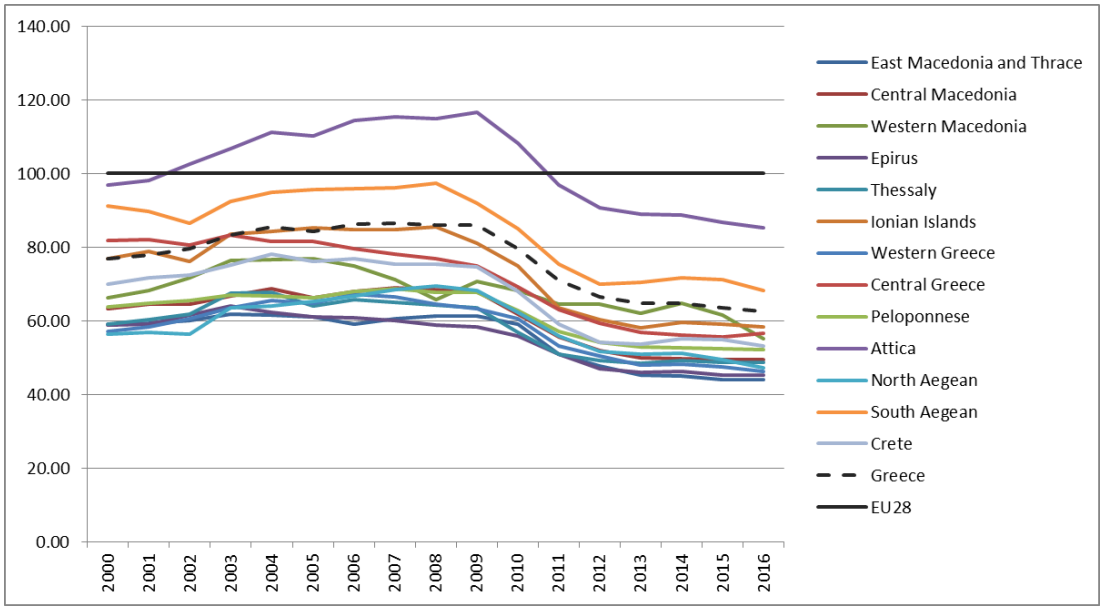
Note: For Greece OECD Territorial Level (TL) 2 regions correspond to Eurostat's NUTS2.
Source: Table 1

[5] For Greece OECD Territorial Level (TL) 2 regions correspond to Eurostat's NUTS2.

[6] Petrakos and Saratsis (2000), Petrakos et al. (2012), Petrakos and Psycharis (2016b).

Figure 2 shows the evolution of regional GDP per capita at TL2[7] (13 regions) level during the period 2000–16. Attica region (top line) maintains its leading position and its distance from the national average (the dashed black line) throughout this period, which also includes the period of the post-2009 economic crisis. All other regions follow a similar pattern of growth and decline, although the speed of adjustment may vary according to their specific characteristics. We also notice that the lagging behind regions at the beginning and the last year are the same. The crisis has affected dramatically the size and the structure of the economy, but it does not seem to have changed to a noticeable degree regional hierarchies.

Figure 2. TL2 regional GDP per capita, 2000-2016 (€/inh, const. 2010 prices, EU28=100)



Note: For Greece OECD Territorial Level (TL) 2 regions correspond to Eurostat's NUTS2.
Source: Estimations from ELSTAT (2018)

Although Attica has maintained its dominant position in the economy during the crisis, this should not hide the serious internal divides within the metropolis, as many inner-city areas and a large part of the working-class districts have all suffered from massive lockouts, employment losses and widespread poverty during the period of the crisis.[8]

The available evidence indicates that inequalities inside the regions are also significant[9] as rural and mountainous or remote areas have a significantly lower performance than regional urban centres. Therefore, the general pattern of regional inequalities in Greece is the combination of a core-periphery component (Athens versus the regions), a south-north component (the islands versus the border regions), an east-west component (the main national transport corridor versus the mountainous range of Pindos), as well as the urban-rural component at the intra-regional level. These disparities at various levels of aggregation draw an overall map of significant spatial inequality that is driven by market dynamics, but also by policy choices.[10]

[7] For Greece OECD Territorial Level (TL) 2 regions correspond to Eurostat's NUTS2.
[8] Maloutas (2014), Artelaris and Kandylis (2014).
[9] Artelaris and Petrakos (2016).
[10] Petrakos and Psycharis (2016)

Regional policy at a glance

Table 2 outlines the regional allocation of ESPA[11] and of the Regional Operational Programs (ROPs), as well as that of the Rural Development Program and the National component of the Public Investment Program (NPIP).[12] It also presents the share of R&D and Entrepreneurship programs in each ROP and the rate of implementation of ROPs (measured as a share of payments to committed amounts by the date).

Table 2. Regional Policy Indicators

Region	ESPA allocated in Regions*		ROP Budget**		Rural Development Program in the region***		NPIP payments 2019	ROP in R&D	ROP in entrepreneurship	ROP implementation****
	(million €)	(%)	(million €)	(%)	(million €)	(%)	(million €)	(%)	(%)	(%)
Greece	**30,753**	**100**	**5,286**	**100**	**5,880**	**100**	**1349.2**	**4.45**	**8.90**	**45.38**
Attica	7,143	23.23	1,050	19.87	170	2.89	166.3	5.54	9.52	52.13
Central Greece	1,715	5.58	193	3.66	450	7.65	36.2	6.06	6.76	47.03
Central Macedonia	6,214	20.21	895	16.93	1,063	18.09	20.2	3.59	10.91	52.75
Crete	1,846	6.00	394	7.46	550	9.35	159.0	5.07	5.75	41.67
East Macedonia - Thrace	2,049	6.66	457	8.65	586	9.96	6.1	2.86	8.15	36.72
Epirus	1,654	5.38	296	5.59	185	3.15	28.6	6.44	8.37	44.80
Ionian Islands	813	2.65	202	3.82	62	1.05	9.8	4.49	6.53	43.40
North Aegean	867	2.82	269	5.09	252	4.29	15.9	4.27	6.87	38.22
Peloponnese	1,329	4.32	255	4.82	559	9.50	21.5	3.09	5.71	44.73
South Aegean	1,051	3.42	155	2.93	147	2.50	14.3	3.47	6.20	54.42
Thessaly	2,128	6.92	377	7.13	899	15.30	23.0	2.79	12.61	39.94
Western Greece	3,010	9.79	449	8.50	533	9.06	23.2	3.92	11.75	41.17
Western Macedonia	933	3.03	294	5.57	425	7.22	18.9	6.60	6.50	34.02

Note: *Based on commitments (ROP) and funding of approved projects (SOP), Public Expenditure by 3/12/2020; **Total EU and national contribution (Public Expenditure), Commitments by 03.12.2020; *** Rural Development Programme 2014-2020 Approvals by 4/12/2020 **** Payments (Public Expenditure) as a share of total budget by 3/12/20.
Source: www.anaptyxi.gov.gr, data.agrotikianaptixi.gr (RDP)

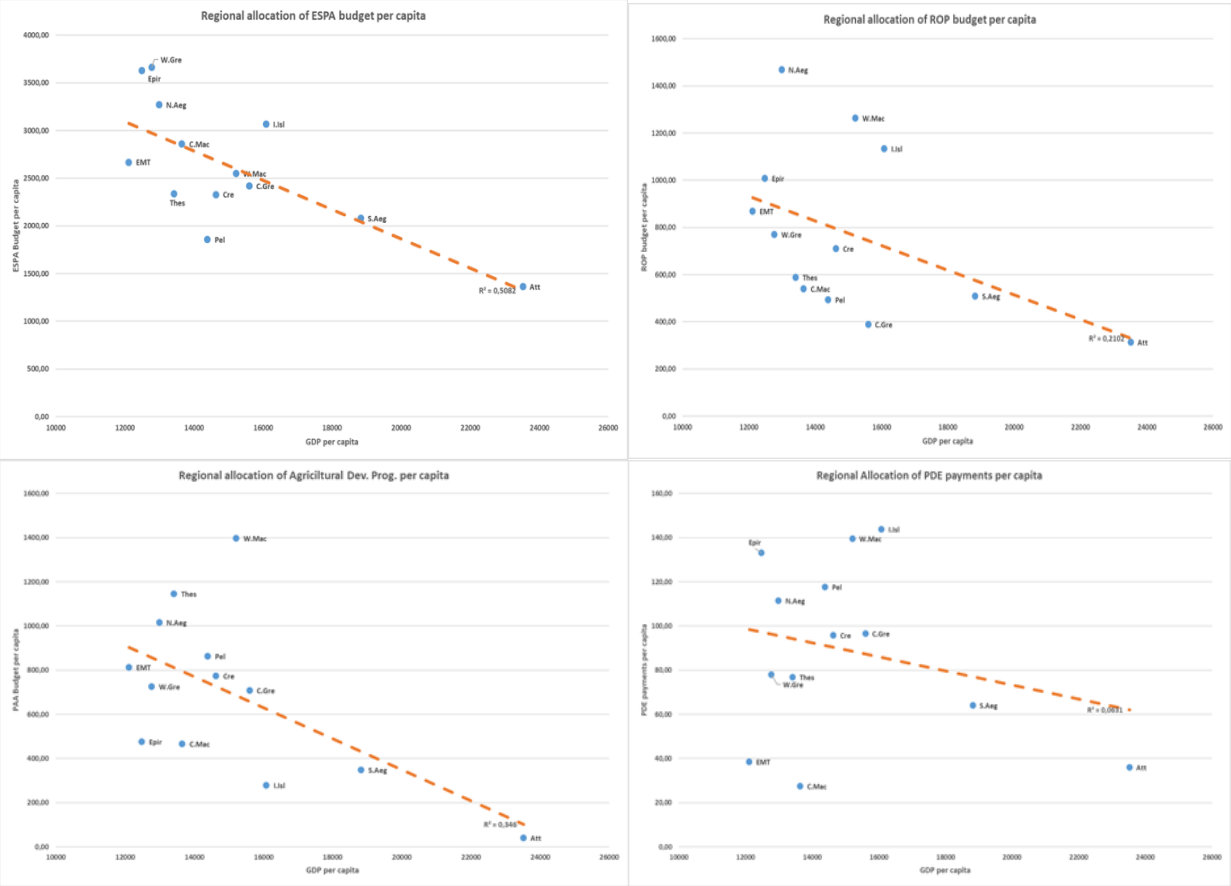
Figure 3 presents the relation of the regional allocations of ESPA, ROPs, RDP and NPIP to the regional GDP per capita. A number of observations can be made from the examination of the Table and the Diagram. First, the resources devoted for the development of the regions in this very critical period are significant. If considered overall, the ESPA and RDP funds for the 2014-20 period and an estimated sum of NPIP of about 5 billion for the same period equal an amount circa 35 billion euros in a period of 7 years. Therefore, being at the end of the programming period, the expectation is that these funds should have a significant impact on regional growth.[13]

Second, the EU funded Programs (ESPA, ROPs and RDP) have an embedded cohesion logic, as they tend to allocate higher level of resources per capita to regions with lower levels of development. Therefore,

[11] Data retrieved on 3.12.2020.
[12] ESPA, ROP and RDP figures are in terms of public expenditure, that is, they include both the EU and the national contribution.
[13] TA recent study indicates that this impact may be conditional on the economic and structural characteristics of the regions (Sotiriou and Tsiapa, 2015).

by design, these Programs contribute to some extent to regional convergence, hence a smaller spread of observations around the trend line would be expected and therefore a more targeted intervention. The same seems to be the case with the NPIP (at least for 2019), although the slope of the line in the diagram is flatter, indicating a weaker influence of GDP per capita in the allocation of NPIP resources.

Figure 3. The contribution of ESPA, ROP, ADF and PIP in regional convergence



Source: Estimates from ELSTAT (2018), EC (2018), RCI (2019)

Third, the allocation of resources going to R&D and entrepreneurship in the ROPs is rather low. Although some regions devote more resources than others, the general picture is that they may not be sufficient to support the needs for investment, innovation and restructuring in a way that ensures the local science base effectively involved and thus promotes permanent science-business partnerships. One explanation is that more resources for R&D and entrepreneurship are available in the Sectoral Programs implemented at the national level. However, these are related to horizontal actions that do not necessarily take into consideration or reflect local needs, capabilities and specializations.

The final observation is that progress in the implementation of the ROPs was relatively slow until early 2020 with a partial but significant recovery pace over the last year. Some regions are doing relatively better than others and the general picture is that payments are roughly around 45% of the budget by early December 2020. Delays in implementation are mostly related to the late start of the programs, resulting from a long preparation and design period. Additionally they are caused by bottlenecks and obstacles caused by over-regulation embedded in the system of operation of Structural Funds, by delays in issuing the necessary permits for projects and finally because of a number of approved projects that are relatively immature.

Development challenges

One of the main goals of the regional workshops and the survey conducted during this study was to identify the main challenges faced by the regions, taking into consideration their different characteristics and idiosyncrasies. Table 3 presents the five (5) most important challenges that have been reported in each region by regional stakeholders. The code in each cell corresponds to the type of challenge, as presented in Table 4. Different shading in both Tables is associated with different broad categories of challenges. The analysis of the regional stakeholders' responses reveals that the top challenges are those related to lack of investment activity, bureaucracy, unemployment, limited high quality products and youth outmigration.

By grouping the different options and responses into broader categories related to main challenges (A. Productive system weaknesses, B. Social problems, C. Unemployment, D. Administrative burdens, E. Infrastructure needs, F. needs for Training), it becomes clear that the challenges related to the productive environment of the regions are considered to be the most important ones. In fact they rank most often (29 times) in the top 5 of the responses of stakeholders.

Unemployment, which appears as the top challenge in many regions, is treated as a separate category, because it can be seen as both a problem of the productive system that does not generate enough jobs and at the same time as a serious social problem. In either case, social problems appear to be the second most important broad category of challenges (cited 11 times), followed by Administrative burden (9 times) and unemployment (8 times). Overall, the weaknesses of the productive system and the social problems are the top challenges faced by most regions.

Table 3. Top five development challenges in the regions

	Major Development Challenges				
	1st	*2nd*	*3rd*	*4th*	*5th*
Attica	C1	A1	D1	B1	B3
Central Macedonia	C1	A1	D1	A6	A2
Thessaly	C1	A1	A2	A6	D1
Western Greece	C1	B2	A1	B1	D1
Crete	D1	A2	E1	F1	A3
East Macedonia - Thrace	C1	A1	D1	A2	B1
Peloponnese	D1	A3	A1	A6	B1
Central Greece	A1	E4	C1	B1	A3
South Aegean	E5	A5	E3	A2	E2
Epirus	C1	A1	B2	B1	A2
Western Macedonia	C1	A1	B1	D1	A5
North Aegean	A3	B1	A2	A4	A5
Ionian Islands	E3	D1	A2	A4	E1

Source: Elaboration from OECD questionnaire survey

Table 4. Broad categories of development challenges

Challenges	*N**	*Broad category*	*N**
A1. Lack of new private investment	9	**A.** Productive system weaknesses	29
A2. Limited specialization in high quality products	8		
A3. Lack of business and innovation support services	3		
A4. Lack of local value chains	2		
A5. Limited sectors and narrow productive base	3		
A6. Dominance of small firms and limited export capacity	3		
B1. Youth outmigration	8	**B.** Social problems	11
B2. Low income and limited local demand	2		
B3. A share of population lives in poverty	1		
B4. Low quality or missing social services	0		
C1. Unemployment	8	**C.** Unemployment	8
D1. Sluggish administrations that do not support investment	9	**D.** Administrative burden	9
D2. Weak territorial cooperation among authorities and stakeholders	0		
E1. Low quality or missing transport infrastructure	2	**E.** Infrastructure needs	7
E2. Low quality or missing sewage and water infrastructure	1		
E3. Low quality or missing waste disposal/processing facilities	2		
E4. Limited presence of Universities and Research Centres	1		
E5. Low quality of health care facilities	1		
F1. Lack of trained, or experienced labour force	1	**F**. Training	1
F2. Low quality or missing vocational training services	0		

Note: * N is the number of times each challenge appears in the top five responses.
Source: Elaboration from OECD questionnaire survey.

Bureaucracy appears to be the third most frequently mentioned challenge, which, however, in some regions appears very high in their list of challenges. It should be noticed that regional stakeholders consider on average that bureaucracy is the first most important factor that causes long delays in the implementation of the structural funds and development policy (the second one is delays in issuing permits and the third is the centralization of the decision making process). They also consider that the central government is mainly responsible for bureaucracy (60% of responses), with the European Commission (26% of responses) and the regional administrations (14% of responses) taking the second and third place.

Missing, or low quality infrastructure of different types (transport, urban, environmental and scientific ones) appears as the fifth most frequently mentioned challenge, while dealing with labour force training appears as the last one.

This being the general pattern, however different regions value and rank these challenges in a different way that apparently stems from their own characteristics. For example, unemployment is considered the top challenge in seven regions, including the two metropolitan ones. However, this is not a top challenge in the island regions. In fact, in the islands it does not even appear among the top five challenges. Likewise, and with the notable exception of North Aegean, affected by youth outmigration, the island regions do not report any serious social problem among the top five challenges. Their focus seems to be more on missing infrastructure, administrative burden and the productive system.

While all regions result showing a common pattern regarding some type of weaknesses of their productive system, they also feature differentiated issues: the mainland and metropolitan regions face more serious unemployment and social challenges, while the island regions more often challenges related to infrastructure. Administrative burden challenges seem to be present in all types of regions. The above analysis indicates that different regions face a different mix of problems and challenges that requires a more focused and place-based approach to designing and implementing policy priorities and actions.

Development opportunities

In order to deal with the detected challenges, regional stakeholders define a number of development opportunities that are relevant to the profile of their respective region. Table 5 presents the top five opportunities. The coding in each cell corresponds to the typology, which is presented in Table 6. Different shading in both Tables is associated with corresponding broad categories of opportunities and (the responding) policy priorities.

The analysis of the regional stakeholders' responses reveals that the top opportunities for the regions are associated with: development of new forms of tourism (ii1: citied in 10 regions among the top 5 opportunities), development of a strong science base (iii1: citied in 10 regions among the top priorities), transformation of the agricultural sector (iv1: cited in 9 regions among the top 5 priorities), protection of the environment and cultural heritage (vi: citied in 8 regions among the top priorities), development of the energy sector (i5: cited by 6 regions among the top priorities), development of new start-ups in ICT, bio- and agro-tech sectors (i4: citied in 5 regions among the top priorities), and restructuring of local and regional administration (vi1: citied in 5 regions among the top priorities).

Table 5. Top five development opportunities for the regions

	Top-5 Development Opportunities				
	1st	*2nd*	*3rd*	*4th*	*5th*
Attica	i4	iii1	v1	i2	iii2
Central Macedonia	i2	iv1	ii1	iii1	i3
Thessaly	iv1	i4	iii1	ii1	vi1
Western Greece	iii1	vi1	iii2	i1	i5
Crete	ii1	iii2	v1	iii1	i5
East Macedonia - Thrace	iv1	i5	i6	iii1	ii1
Peloponnese	ii1	iv1	v1	iii1	i1
Central Greece	iv1	iii1	ii1	i5	vi1
South Aegean	ii1	v1	vi1	i4	iv1
Epirus	iv1	ii1	v1	vi1	i3
Western Macedonia	iv1	vi2	i4	i5	i2
North Aegean	ii1	v1	iii1	i4	i3
Ionian Islands	ii1	v1	i5	iii1	iv1

Source: Elaboration from OECD questionnaire survey.

By grouping different opportunities in broader categories (marked with the same shade in Tables 5 and 6), we observe that those related to industrial development and restructuring (i) prevail in the general picture, as they are citied among the top five priorities more often (20 times) than any other category. They are followed by opportunities related to the science base of the regions (iii), those related to the development of a new form of tourism industry (ii), to agriculture (iv), to culture, quality of life and the environment (v) and the restructuring of local/regional administration and new forms of governance (vi).

The emphasis on industry (modernization of existing industry, new sectors, support value-chains, new start-ups, renewable energy and logistics) is in line with the discussions and policies for the re-industrialization of Europe as well as aligned to the capabilities of most regions. It is highly compatible and complementary with the second broad category, which aims to develop a strong science base supporting the innovative activity of industry. The third broad category, related to the development of new forms of tourism, is highly compatible with the development of a new and more diverse agriculture (fourth broad category) and the preservation of culture and the environment (fifth category). The restructuring of the local and regional administration (sixth broad category) is compatible and conducive to all other priorities.

Although this is the general pattern, each region values and ranks opportunities in a differentiated way that conforms better its own characteristics and challenges. For example, island regions place more emphasis on tourism (that appears as a top ranked opportunity in all of them) and on the protection of the quality of environment, heritage and life (that appears in the second or third place in all of them). The metropolitan region of Attica identifies a mix of opportunities that places an emphasis on innovative start-ups, its rich science base, the environment and its historical heritage. Central Macedonia, the second metropolitan region, identifies a mix of opportunities and policy priorities in new industrial sectors with competitive advantages, agriculture, tourism, its science base and value-chains. Islands place more emphasis on tourism and the preservation of their physical and cultural environment. All of them combine these top priorities with some short of industrial development (new start-ups, energy, value-chains), while some also see opportunities in developing their science base and the primary sector.

Table 6. Broad categories of development opportunities

Priorities	N*	Broad category	N*
1. Support existing manufacturing sectors in which the region has already a comparative advantage and experienced workforce to modernize production technology, improve products and seek new export markets.	2	i. Industry	20
2. Support the development of new manufacturing sectors in which the regions can develop a comparative advantage based on a development plan that seek diversification of the production base through targeted and coordinated policies at the regional and local level.	3		
3. Develop value chains (local forwards and backwards linkages) in sectors of strong competitive advantage in order to withhold locally a greater part of the value added of tradable products and services.	3		
4. Develop new start-ups in the ICT, bio-food, bio-health, agro-tech, social economy, circular economy or other high profile and frontier sectors, with the support and cooperation of research labs, incubators and innovation or business support services	5		
5. Develop the energy sector through investment in renewable energy projects, such as solar, aeolic, geothermal, hydroelectric, as well as local energy networks that will reduce the energy cost of production and make the region an attractive investment destination	6		
6. Take advantage of national or international transport networks to develop logistic services and/or assembly lines for tradable commodities in specific transportation hubs in the region.	1		
1. Develop new forms of tourism (gastronomic, agro-tourism, health, cruise/yachting, winter, experience, etc.), expand touristic period, and connect tourism with the local agriculture, food, science, culture and craft sectors.	10	ii. Tourism	10
1. Develop a strong science base (Universities, Research and Innovation Centres) that will support key economic sectors to become innovative and competitive and attract high quality human resources to the region	10	iii. Science base	13
2. Make the region an academic destination by developing strong academic institutions, facilities and services attracting students and scientists from other regions and abroad for research, work or study, making Higher Education an important industry for the region.	3		
1. Support the transformation and diversification of the primary sector towards quality and organic products and develop a new agro-food sector exporting to niche and high-end markets.	9	iv. Agriculture	9
1. Preserve the environment, as well as cultural, architectural or historical heritage, improve local amenities and services and make quality of life an asset that will attract new residents in the region.	7	v. Environment and cultural heritage	7
1. Transform local and regional government to an efficient mechanism supporting economic activities and new investment in the region by providing effective land and development planning, services and permits.	5	vi. Administration	6
2. Develop a regional incentives framework that will include long-term concession of municipal land and a number of local services and support in order to actively attract large investment of domestic or foreign origin in sectors that can benefit from the advantages and characteristics of the region and operate complementary developing linkages with the regional production fabric	1		

Note: * N is the number of times each challenge appears in the top five responses.
Source: Elaboration from OECD questionnaire survey.

On the other hand, less advanced mainland regions tend to identify a mix of opportunities that includes in the top places the qualitative upgrading and restructuring of agriculture, some type of actions related to industrial development and the development of new forms of tourism. Some regions that are already endowed with strong academic and research institutions (or some that expect or strive to do so) expect a more decisive role for their science base in supporting the innovative activity of the regional economy, while some others see a new development role for local and regional governments.

The figures show that the mix of top opportunities of the regions depends to a large extent on their economic and structural characteristics and responds to the challenges they face. From the national perspective it is important that the regions identify windows of opportunity for a new production model based on quality, diversification, extroversion, technological upgrade, value chains, start-ups in frontier sectors, science-industry cooperation, sustainability and a new model of governance. At the regional level, however, the right mix (that will largely affect policy choices) relies on local assets and knowledge that need to be mobilized in a policy climate encouraging their participation in the design and implementation development programs.

Development priorities for the next Programming Period

The combination of development challenges and opportunities determines to a large extent policy priorities. Regional stakeholders have identified in Table 4 the weaknesses of the productive system (lack of investment, quality products, value chains, limited specializations and small firms) as the top development challenge. They have also identified social problems (outmigration, low income, poverty) and bureaucracy to be the second and third most important challenge, followed by unemployment and missing infrastructure. Also, they have identified in Table 6 in broad lines the productive sectors (industry, tourism and agriculture) and the science base of the regions as the areas where top development opportunities arise. These choices determine to a large extent their preference for the allocation of resources in the next 2021-27 programming period among policy priorities.

Tables 7 and 8 present the suggested allocation of resources in the next programming period to three main policy priorities related to (A) the productive system, (B) infrastructure and (C) human capital. They also present the ranking of these priorities at the regional and national level.

Priority A relates to policies that will improve the productive system of the region by enhancing investment, employment, innovation, competitiveness, value chains, product diversification, economic restructuring, and start-ups.

Priority (B) is related to policies that will improve transport infrastructure (roads and rail), urban infrastructure (sewage and water), environmental infrastructure (waste and protection), digital infrastructure (broadband networks) and energy infrastructure (renewable sources).

Finally, priority (C) refers to policies that will improve human resources including education, vocational training, higher education, research, skill development, access to market, reverse brain drain and support disable and socially excluded.

Table 7 shows the partition of funds across the three broad development priorities as suggested by regional stakeholders. The figures in the Table indicate the percentage of the total budget of the next programming period allocated to each priority, while the shade is associated with the ranking of priorities in each region. The majority of the regions consider as top development priority the policies and programs related to the productive system of the regions. In fact the productive system priority appears either in the first (9 regions) or in the second (3 regions) place of 12 regions and flags a very clear and robust strong preference. The other two priorities are resulting closer in the choice of the stakeholders, although ‘infrastructure’ appears more often in the first (3 regions) and the second place of the ranking (5 regions) than ‘human capital’, the latter more often in the third place (7 regions).

Different regions show different needs and corresponding different priorities. For example, most island regions reporting significant challenges related to missing or decaying infrastructure and the environment, give a higher priority to policies related to infrastructure. A number of other regions, including the two metropolitan and most mainland, follow a different pattern, ranking programs and policies for the productive system, human capital and infrastructure in the first, second and third place respectively.

Table 7. Development priorities and allocation of resources in the regions

	Share of resources allocated to broad development priorities		
	A	B	C
	Production system	Infrastructure	Human capital
Attica	40	28	32
Central Macedonia	50	22	28
Thessaly	38	31	31
Western Greece	41	31	28
Crete	32	37	27
East Macedonia - Thrace	41	32	27
Peloponnese	40	29	31
Central Greece	43	25	32
South Aegean	32	41	27
Epirus	37	36	27
Western Macedonia	52	25	23
North Aegean	29	45	26
Ionian Islands	28	32	40

Note:

1st development priority
2nd development priority
3rd development priority

Source: Elaboration from OECD questionnaire survey

This general trend is a shift from the resources allocated in previous programming periods, where infrastructures of all types (and in all sources of funding) were the top priority. One explanation is that most major infrastructure projects have already been completed. In the regions where transport infrastructure is still missing in the form of road network (Crete, Western Greece, Epirus), ports or marines and environmental infrastructure (North and South Aegean), as the figures underscore. A second explanation relates to the understanding that infrastructure projects may improve the quality of life in the regions, but it is not always clear if they can have a lasting impact on unemployment, which is a top development challenge, beyond the construction period. As a result, 'infrastructure' still remains a significant policy domain in regions with well-defined needs, but it does not result to be overall the top policy priority.

On the other hand, policies and programs related to the productive system and the human resources of the regions address the most important development challenges they face: unemployment, lack off investment, low quality products and youth outmigration. They also take into consideration and respond to the top development opportunities of most regions, related to the development of industry, tourism, agriculture and their science base.

Overall, the regions, as from the survey results, are considering a new phase of development policy giving more emphasis and priority to the needs of their productive system, human resources and their emerging knowledge base. The regional stakeholders of the survey[14] and the participants to the four Regional Seminars tend to suggest an allocation of resources that prioritizes investment, employment creation,

[14] Overall, 186 regional stakeholders from the local and regional administration, the productive sector, the science base and the civil society participated in the survey.

innovation, competitiveness, value chains, product diversification, economic restructuring, and start-ups. These policies account for about 40% of the total available resources (Table 8).

Table 8. Ranking of development priorities

		1st Priority in:	2nd priority in:	3rd priority in:	Average budget share
Production system	Improve the productive system of the region (enhance investment, employment, innovation, competitiveness, value chains, product diversification, economic restructuring, start-ups)	9 regions	3 regions	1 regions	40%
Infrastructure	Improve infrastructure (transport: roads and rail, urban: sewage and water, environmental: waste and protection, digital: 4G broadband networks , energy: renewable)	3 regions	5 regions	5 regions	32%
Human capital	Improve human resources (education, vocational training, higher education, research, skill development, access to market, reverse brain drain, support disable and socially excluded)	1 regions	5 regions	7 regions	28%

Source: Elaboration from OECD questionnaire survey

Second rank the policies and programs supporting transport, urban, environmental and digital infrastructure, which account for about 32% of the available resources. These policies and programs are also highly compatible with new investment and the competitiveness of the regional productive systems, to the extent that they solve critical problems of accessibility or environmental quality.

In the third place, but in a close tie of preferences, appear policies targeting the human resources, such as education, training, research, access to lab or market and support for the disabled and the socially excluded, about 28% of the available funds. These policy priorities are highly compatible to priorities related to the productive environment, as the quality of the human resources is perhaps the most significant contributor to innovation, competitiveness and new business creation.

The fact that different regions choose a different mix of these three broad development policy priorities indicates that local needs and the local knowledge should be a critical ingredient in the design of the next programming period. This requires a less cumbersome administrative setting and a place-based approach to designing and implementing policies and programs.

Concluding remarks

The Greek regions face significant development challenges and they need to embark into a growth and restructuring process aiming to a double convergence. On the one hand, the less advanced peripheral regions need to converge towards the frontrunner metropolitan region, and on the other, Greece as a whole (including its metropolitan region) needs to converge towards the EU average in terms of GDP per capita and other welfare and competitiveness indicators. During the last decade, all regions have experienced a average -25% dramatic drop in their GDP, while many have seen their population to decline and age, due to significant youth outmigration. The existing mix of development policy (largely implemented through the Structural Funds) has alleviated to some extent the impact of the crisis, but has not been able to deter its adverse effects on employment and growth. Most regions suffer from structural weaknesses related to a narrow productive base and lack of quality and scale effects, missing value chains and limited innovative activity that affect the competitiveness of their economy.

To deal with these problems, development policy has to focus closer to the challenges regions face and the opportunities they identify for restructuring and growth, by setting policy priorities and actions in a way that is sufficiently informed from the local experience and knowledge. In doing so, regional stakeholders point to three areas of institutional reforms of utmost importance. The first (i) is related to a simplification of policy design and implementation processes; (ii) the second is related to a decentralization of accountability and decision making power, allowing for a more place-based approach to policy;(iii) the third is related to building capacities in the local and regional administrations in order to enable them to respond to the challenges they face in a more effective way.

Nonetheless, decentralization in responsibilities and decision-making and the new system of territorial policy governance should be an integral part of a national strategic plan for regional development, which will detect and interpret correctly the type and intensity of spatial imbalances and define the goal of inclusive and sustainable growth in a spatial context and in a meaningful way. This strategic plan should provide an evidence-based allocation of total resources (not only the structural funds) and responsibilities and the required checks and balances among the three levels of administration that will ensure that top-down and bottom-up approaches, horizontal and place-based policies are well functioning and integrated in a new model of governance that promotes growth, sustainability and cohesion in a more timely, effective and accountable way.

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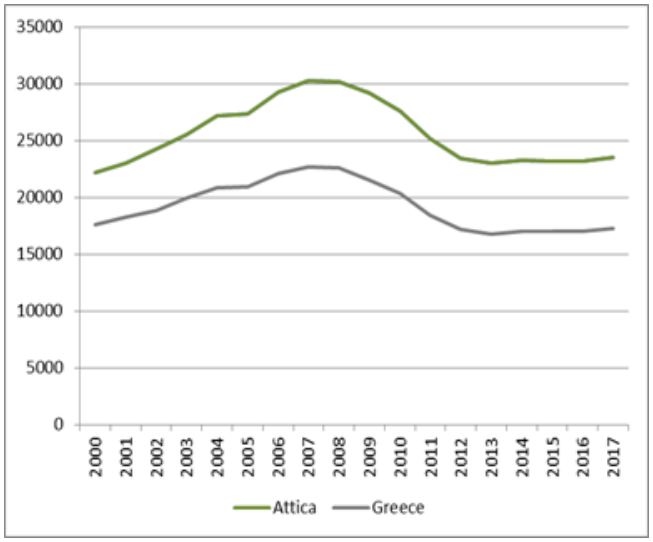
1 Attica

Figure 1.1. Location of the region of Attica

Figure 1.2. GDP per capita in Attica (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020.

Local Government, Geography and Demography

The Region of Attica encompasses the Athens metropolitan area and borders the Region of Central Greece to the north-west and the Region of Peloponnese to the south-east. Athens, with about 3,787,386 inhabitants, is the capital of the Regional Administration of Attica and the Decentralized Administration of Attica. The region is divided into 66 municipalities (Table 1.1).

Table 1.1. Information on the administrative structure of the region of Attica

Regional Self Government	A Governor and a Regional Council are elected directly in Attica for a 4-year term.
Decentralised administration	Attica belongs to the Decentralized Administration of Attica. The capital of the Decentralized Administration is the city of Athens.
Regional units (population)	Central Sector of Athens (1,022,853), North Sector of Athens (585,183), South Sector of Athens (522,798), West Sector of Athens (480,851), Pireaus (443,888), Islands (73,865), Eastern Attica (498,183), Western Attica (159,765)
Municipalities	The Region of Attica has 66 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.

Capital city	The city of Athens with a population of 3,787,386 inh. (year 2011). Athens is a Functional Urban Area (FUA, large metropolitan area) of 3,610,000 inh. (2015).
Other major cities (inhabitants)	-
Regional institutions in Attica	Athens Chamber of Commerce Technical Chamber of Greece Democritus Research Centre National and Kapodistrian University of Athens National Technical University of Athens Athens University of Economics and Business University of Piraeus Panteion University Harokopio University Agricultural University of Athens University of Western Attica Athens School of Fine Arts Regional Association of Attica Municipalities Attica Islands Network All major National Institutions have their seat in Athens

Source: ELSTAT (2019) OECD (2019b)

Attica is the most populated region of Greece with 3,756,453 inhabitants in 2018 and the most urbanized. The region has experienced one of the highest population declines in the post-2008 period. Ageing in Attica is an issue of relatively minor importance, as the share of population over 70 years old is lower than the Greek or EU levels, while the index had a modest increase (2.8%) during the crisis[15]. This is also confirmed by the elderly dependency ratio, which, in 2019, was 32.0%, below the national average. The share of population (25-64 years) with tertiary education is 38.4%, above the national and the EU average. Nearly the total population of the region lives in cities, as the urbanization rate is close to 100%. Finally, the index of crude rate of net migration for the region of Attica is negative, reflecting the emigration-generated population decrease in the area, while during the last decade it presented a moderate decrease (Table 1.2).

Table 1.2. Indicators for the population characteristics of the region of Attica

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	3,756,453	*1*	35[a]		-0.60	*12*
Population share (%) in the country, 2017	35.0	*1*			-2.9	*13*
Population density (inh/km^2), 2018	986.5	*1*	1212	840	-0.60	*12*
(%) Population >70, 2011	12.9	*12*	87	98	2.8	*7*
Youth Dependency Ratio[b], 2019	22.1	*8*	98		1.0	*2*
Elderly Dependency Ratio[b], 2019	32.0	*11*	92		2.9	*1*
(%) Population (25-64 years) with tertiary education[e]	38.4	*1*	124	122	3.5	*7*

[15] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Urbanization ratio, 2011	99.0	*1*	129		0.0	*12*
Crude rate of net migration[d], 2017	-2.2	*11*			-2.4[c]	*7*

Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020. Notes: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a).e: period 2001-2011.

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region includes a small primary sector with the lowest GDP share across the country. The relative productivity of the primary sector in Attica, although smaller than that of industry and services, in relative terms is higher than the national average (1.5) or the one of other EU regions (1.3). The primary sector is based on the agricultural and livestock sector (Table 1.3).

The region has a modest presence of the secondary sector, with a share in the regional GDP relatively small (10th in position) and lower than the national and the EU average. Notice, however, that a large part of industrial activity of Attica relocated outside the regional borders in the triangle Schimatari – Inofita – Chalkida in the north and Agii Theodori (in the south) during the 80s and 90s because of environmental restrictions and investment subsidies. On the other hand, the tertiary sector has a high share in regional GDP (ranking the third highest in the country) while its productivity level is close to the national and EU average (Table 1.3).

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Attica has developed a strong specialization (with LQ>1.25) in several branches of services and specifically in information and communication, in professional, scientific and technical activities, and in financial and insurance activities, with a lower but still remarkable specialization in administrative and support services (Table 1.4).

Table 1.3. Structural indicators of production in the region of Attica

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	0.4	*13*	10	26	1.3	*12*
(%) Secondary in GDP, 2016	13.3	*10*	78	53	-1.0	*9*
(%) Tertiary in GDP, 2016	86.3	*3*	109	116	0.2	*1*
(%) Primary in Employment, 2015	0.8	*13*	7	17	-0.5	*7*
(%) Secondary in Employment, 2015	12.0	*10*	91	55	-5.6	*12*
(%) Tertiary in Employment, 2015	87.2	*1*	115	118	1.1	*9*
(%GDP)/(%Employment) Primary, 2016	0.5	*4*	131	154	2.1	*9*
(%GDP)/(%Employment) Secondary, 2016	1.1	*9*	85	97	5.5	*4*
(%GDP)/(%Employment) Tertiary, 2016	1.0	*11*	96	98	-1.0	*3*

Source: Sources: OECD (2019a), ELSTAT (2019).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export oriented system with strong or significant specializations (RCA>1.25) in science-based sectors, specialized supplier sectors, and scale-intensive sectors (Table 1.4).

Attica shows a highly diversified production base, having developed some level of specialization in 26 (out of 38) NACE2 branches. Strong or high specialization in other transport equipment, pharmaceutical products, printing and publishing, manufacturing of radio, television and other communication equipment and apparatus, chemicals, financial institutions and insurance, coke and petroleum, and electronic equipment and optical instruments. Weak to modest specialization in other 24 sectors, most of them in services. Moreover the region displays overall specialization in 14 tradable branches.

The region takes advantage of its highly diverse production base in order to develop value chains through local forwards and backwards linkages, especially in the branches of specialization. These linkages are strong and the region's prospects for growth are supported by high regional multipliers[16]. 24 branches appear to have regional multipliers greater than one, 14 of them are in tradable branches and 15 in branches the region is specialized. This implies that in most branches, an increase in regional demand (for example due to higher touristic flows, public spending, or exports) leads to an equal or higher increase in regional production.

Table 1.4. Sectoral specialisation in the region of Attica

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	0.06	*13*		
LQ in mining, energy, electricity, water supply, 2016	0.36	*10*		
LQ in manufacturing, 2016	0.96	*6*		
LQ in construction, 2016	0.7	*13*		
LQ in distr. trade, transport, accom., food serv., 2016	0.99	*4*		
LQ in information and communication, 2016	3.17	*1*		
LQ in financial and insurance activities, 2016	2.38	*1*		
LQ in professional, scientific and technical act., 2016	2.53	*1*		
LQ in administrative and support services, 2016	1.0	*7*		
LQ in other services, 2016	1.01	*7*		
RCA[b] in agricultural sector, 2012	0.5	*12*	3.0	*6*
RCA in resource-intensive sector, 2012	1.0	*3*	-3.9	*7*
RCA in labour-intensive sector, 2012	0.7	*6*	2.2	*7*
RCA in scale-intensive sector, 2012	1.3	*3*	3.0	*5*
RCA in specialized supplier sector, 2012	1.5	*1*	2.9	*4*
RCA in science-based sector, 2012	1.8	*1*	3.9	*6*
Diversification of productive base [c], 2011	26 (2/*14*)	*1*		
Sectors with regional multiplier effects >1[d], 2011	24(15/*14*)	*1*		

[16] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Source: Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performances and current trends

Being the largest regional economy in Greece Attica is generating 47.3% of the national GDP. Similarly, its development level, in GDP per capita terms, is the highest in the country (136%), but lower than the EU average (90%). Both GDP and GDP per capita have declined during the last decade by 3.7% and 3.1%, respectively, one of the highest drops in the absolute terms of GDP. The productivity level in Attica is the highest in the country (124%), but lower compared to the EU (81%). It has declined in the post-2008 period by 1.8%, which is a moderate drop in relation to the other regions.

The merchandise exports of the region are equal to 14.7% of GDP and have increased by 6.2% annually, placing Attica in the 3rd and 9th place in the respective figures. Despite the relatively good position of the region in the country, the share of exports in GDP terms is less than half of the EU average (45%). Attica has a significant record in the European Regional Innovation Scoreboard, ranking 1st among Greek regions, but this figure is below the EU average (75%). Its performance improved during the last decade, as the relative indicator has increased annually by 0.8%, the fifth higher figure in the country (Table 1.5).

Attica is experiencing a high unemployment rate (20.2%) that is slightly higher than the national average, but dramatically higher than the EU average. Unemployment on average increased by 11.5% annually during the last decade, holding the second higher position in the country, while the employment ratio declined by 1.9%.

Table 1.5. Indicators of development, competitiveness and welfare for the region of Attica

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	OECD=100	Annual change (%)	*National Rank*
GDP, 2016 (constant 2010 prices, ml. €)	88,877	*1*	48[a]			-3.7	*10*
GDP per capita, 2016 (€/inh.)	23,529	*1*	136	90	87	-3.1	*5*
GDP share (%) in the country, 2017	47.3	*1*				-1.9	*10*
Employment share (%) in the country, 2017	36.7	*1*				-0.7	*13*
(%) Employment/Population, 2018	42.3	*6*	101	100		-1.9	*13*
(%) Unemployment, 2018	20.2	*6*	103	289	18[d]	11.5	*2*
Productivity (GVA/worker, thousand €), 2017	46.8	*1*	124	81[c]		-1.8	*9*
Merchandise exports to	14.7	*3*	104	45		6.2	*9*

GDP ratio, 2016							
Regional Innovation Scoreboard, 2017	76.9	*1*		75		0.8[b]	*5*

Note: a): the value is the national share of the region, b) period 2009-2017, c) for the year 2016, d) Ranking per high unemployment among 347 OECD regions (OECD, 2018).
Source: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

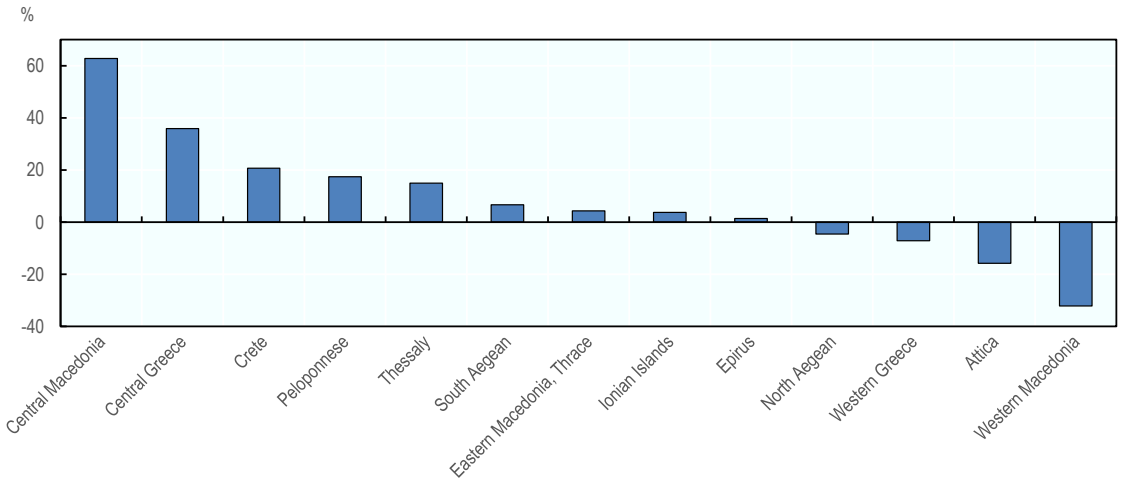
According to the OECD analysis and the Social Scoreboard indicators published by Eurostat (2019b), Attica is facing serious social issues related to the condition of its human resources (Figure 1.5). The figures show that 12% of the young people in the age group 15-24 are excluded from education or the labour market and that the share of population at risk of poverty and social exclusion is 28%. These figures are slightly lower than the national average. Likewise, the region is doing worse than the national average in terms of other indicators, as almost 10% of the population of Attica does not have access to health services, and 76% of jobless people are long-term unemployed (Table 1.6).

Table 1.6. Social indicators for the region of Attica, 2018

Social indicator	Greece	Attica
Share of population with lack of access to health services	8.8	9.8
Long-term unemployment	70.3	76.0
Youth aged 15-24 excluded from education or the labour market	14.1	12.4
Share of people in danger of poverty or social exclusion	31.8	28.3

Source: Eurostat (2019b).

Figure 1.3. Regional contribution to national GDP growth in Greece, 2015-2017

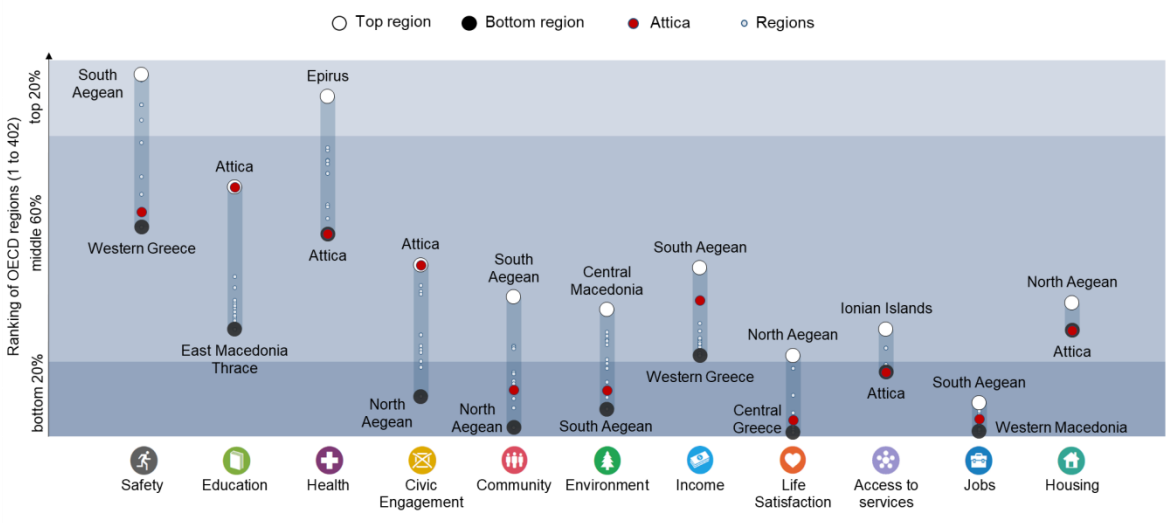


Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Attica is quite variable in the OECD well-being indicators (2019c, figure 1.4 and figure 1.5). Compared to 402 OECD regions, Attica belongs to the middle 60% group in the fields of safety, education, health, civic engagement, income, and housing. Compared to the other OECD regions, Attica is having a relatively high score in safety, health and education and very low scores in terms of community,

environment, access to services, and jobs. When compared to the other Greek regions, Attica is above the national average in education, civic engagement, and income, close to the national average in health, community, jobs, housing, and life satisfaction, below the national average in safety, environment, and access to services.

Figure 1.4. Regional well-being indicators for Attica



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Figure 1.5. Individual well-being indicators outcomes in Attica and Greece

	Country Average	OECD median region	Attica
Safety			
Homicide Rate (per 100 000 people), 2016	0.8	1.3	1.0
Education			
Labour force with at least upper secondary education (%), 2017	76.7	81.7	86.9
Health			
Life Expectancy at birth (years), 2016	81.5	80.4	81.0
Age adjusted mortality rate (per 1 000 people), 2016	7.5	8.1	7.8
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63.6	70.9	69.5
Community			
Perceived social network support (%), 2013	81.1	91.4	79.7
Environment			
Level of air pollution in PM2.5 (µg/m³), 2015	18.4	12.4	21.6
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	..
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5.6	6.8	5.2
Access to services			
Households with broadband access (%), 2017	65.0	78.0	59.0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53.7	67.7	55.0
Unemployment rate 15 to 64 years old (%), 2017	21.8	5.5	21.8
Housing			
Rooms per person, 2016	1.5	1.8	1.5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates. In Greece, blue economy employs over 333,500 people and generates around € 7.2 billion in GVA.

According to the 2019 Annual Report on Greek Aquaculture by the Federation of Greek Mari-cultures, which presents data for 2017-2018, in Attica there are 27 aquaculture units, representing the 7,22% of the national aquaculture production and 8% of the country's' units. It also, represents the 12.7% of the aquaculture sector's employment. Currently there are plans to strengthen aquaculture in Attica, creating Allocated Zones for Aquaculture (AZAs) in the islands of Poros and Salamina, the sea area in the bay of Megarwn and the Methana, which are classified in categories A and B of PAY.[17]

[17] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect

The professional fishing fleet of Attica represents about 10% of the national fleet and includes small coastal fishing vessels as well as medium and overseas fishing vessels. According to the 2014-2019 Strategic Planning of the Attica Region, there were 1,587 professional fishing vessels in Attica in 2015, with a capacity 15 000 GT (Gross Tonnage), counting for 3 130 jobs.

The region of Attica hosts the Hellenic Centre for Marine Research (HCMR), which is a governmental organization operating under the supervision of the General Secretariat for Research and Technology (GSRT) of the Ministry of Education, Research and Religious Affairs. HCMR is composed by three Research Institutes: The Institute of Marine Biology, Biotechnology and Aquaculture (IMBBC), the Institute of Marine Biological Resources and Inland Waters (IMBRIW) and the Institute of Oceanography (IO). The blue lab created by the Municipality of Piraeus (en.bluelab.gr) promotes and supports business innovation exclusively for Blue Growth in Greece. It is an initiative of the Municipality of Piraeus, aiming to provide a springboard for developing new ventures, ideas and products using advanced technology within the Blue Economy. Piraeus also hosts the Maritime Hellas Cluster (http://www.maritimehellas.org/) supported by the Hellenic Chamber of Shipping, the Union of Greek Ship-owners and the Piraeus Chamber of Commerce & Industry.

The port of Piraeus is one of the biggest and most important ports in Europe.[18] Other important ports in Attica are in Rafina (passengers), Elefsina (cargo and passengers) and Lavrio (cargo and passengers).[19] Piraeus serves the city of Athens, which counts 40% of the population and 60% of the economic activity of the country. Its geographical location makes it a key gate for internal connections between islands and mainland Greece and also for international trade and tourism. The activity of the Port is extremely complex and combines cargo services (conventional and unified; import-export and in transit), the service of passengers (both coastal shipping and cruise ships) and shipbuilding and repair activities.

Enabling Factors

Transport, health digital infrastructure and environment

The transport infrastructure of Attica, according to the relevant indicators, is above the national average. In terms of road density and freight transport, the region holds the first and the tenth position respectively.

In terms of air and port transport, Attica hosts the largest airport and the largest port in the country both with a core position in the TEN-T network in Europe, while it has one more airport and three ports inserted in the TEN-T network. In terms of health infrastructure, the region holds the second position in the country with respect to the number of hospital beds per inhabitant, with a modest decrease of this indicator during the crisis period (Table 1.7).

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the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

[18] The Port of Piraeus is: the first in size and traffic Port of the country; a strategic connection with the EU and the rest of the world; the most important port in the country for the supply of raw materials and finished products; the most important hub of the country for worldwide export; the most important hub of the country for the transport of the tourist wave, either abroad (cruise ships) or domestic (coastal shipping); the main supply hub of goods and people to Crete and the Aegean islands; the most important and largest shipbuilding base in Greece.

[19] In Attica, there are also 20 less important ports on the mainland (e.g. Megara, Oropos, Perama, Agia Marina, etc.) and islands' ports (e.g. Salamina, Souvala, Spetses, Diakofti, Potamos, etc.).

Finally, air pollution in Attica is in high levels compared to the other regions (3rd place), with one of the slowest rates of decline in the country (2.1%).

Table 1.7. Indicators of infrastructure for the region of Attica

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	60.5	*1*	198		
Commercial airports	2(**1**/*1*)[c]	*5*	5[a]		
Passengers in air transport/1000 inh, 2016	5.3	*5*	126	3.2	*8*
Commercial ports	9(**1**/*3*)[c]	*6*	7[a]		
Passengers in maritime transport/1000 inh, 2016	4.7	*5*	162	-5.3	*10*
Road freight transport (thousand tons/inh), 2017	21.6	*10*	47	8.4[b]	*2*
Hospital beds/10,000inh., 2015	51.3	*2*	121.2	-1.8	*7*
Air Pollution in PM2.5 (µg/m³), 2017	17.4	*3*		-2.1	*5*

Note: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Source: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013).

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. Arguably, in the case of Attica the figures show that R&D-related expenditure is higher compared to the national average, a performance that is similar in all sub-categories of expenditure (Table 1.8).

Table 1.8. Indicators of innovation and development policies for the region of Attica

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	270.4	*1*	167	4.2[b]	*7*
R&D Expenditure in firms (€/inh), 2016	146.1	*1*	214	6.5[b]	*10*
R&D Expenditure in public sector (€/inh), 2016	61.1	*2*	151	4.4[b]	*12*
R&D Expenditure, tertiary education (€/inh), 2016	60.4	*4*	117	-0.03[b]	*9*

Patent applications per million inhabitants, 2015	19.6	*1*	206	2.8	*2*
Public Investment (€), 2017	859,321,366	*2*	28[a]	-5.7	*11*
Public Investment per head (€/inh), 2017	227.7	*8*	82	-5.6	*11*
% ESPA allocated in the region	23.2	*1*			
% National Rural Development Program allocated to the region	2.9	*11*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively
Source: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020)

The private and public sector hold the first and second position, respectively, in the country in terms of R&D expenditures, while tertiary education the fourth. During the crisis period 2008-16, two out of three sub-categories (private and public sector) presented a modest increase in the indicator.

In terms of patent applications per million inhabitants, Attica has the best performance in the country, and the second higher increase of the index during the period 2008-05.

Public Investments and European Structural Funds in Attica

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is an indication of the commitment of the State to regional cohesion and balanced growth. Attica receives 28% of the Public Investment national budget against a population share of 35% and a GDP share of 47%. As a result, the per capita figure is lower compared to the national average (Table 1.8).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics of the region, as Attica receives 19.9% of the amount of ESPA allocated to Regional Operational Programs in Greece and 23.2% of the total amount of ESPA. Attica also receives 2.9% of the Rural Development Program (Common Agricultural Policy), a figure that is one of the lowest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 1.8).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Attica includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[20] that altogether define the development strategy of the Region.

[20] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong

The development strategy, after a period of open consultation with regional stakeholders, is decided by the Regional Council of Attica, included in the programming documents of the ROP and finally approved by the European Commission. The Vision of the region of Attica is 'the social, economic and environmental reconstruction of Attica, as a region of Europe, with its cultural identity, local productive forces, technology and innovation to be the levers of development and with the activation of civil society and the encouragement of the participation of citizens in the integrated and balanced development to be the central point of reference'.

The strategic Objectives of the ROP are stemming from the 11 Thematic Objectives for the programming period 2014-20. They are tailored to the specific conditions of Attica so as to ensure that the ROP will be consistent and focused on existing regional development problems. They are:

Exploitation and improvement of research infrastructure and human resources

Development of entrepreneurship, including the social economy

Completion of basic infrastructure (particularly, the environmental protection infrastructure)

Reduction of intra-regional disparities

Tackling of poverty and social marginalization of population groups

The Regional Operational Program (ROP) of Attica is about 1.05 billion euro (Table 1.9), in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than 41% of these funds address environmental (27.9%) and transport (13.9%) projects or actions, while a high share of resources is devoted to human resources development and protection (41.2%). A relatively smaller amount is available for actions in support of entrepreneurship (9.5%) and for research and technology (5.5%) (Table 1.9).

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Attica assigns more resources to research and technology (135%), human capital and social care (121%) and entrepreneurship (120%), and less in environment (92%) and transport (66%).

The progress in the implementation of the ROP is high in terms of contracting, with about 108.2% of the budget of ROP (by the beginning of December 2020) has been contracted for projects and actions, and relatively slow in expenditures with 52.1% actually disbursed. The latter is a rather poor performance, which, however, is better than the national average. The worst performance in the implementation process in terms of expenditure is observed in the human capital and social care (46.1%) priority, whereas the best is in transport (60.9%) (Table 1.9).

Table 1.9. Indicators for the Regional Operational Programs of the region of Attica

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP budget. (Public expenditure) (€), 2014-2020	1,050,256,191	*1*	19.87[a]	108.2	*124 (1)*	52.1	*119 (3)*	
% ROP in research and technology	5.5	*4*	124	70.4	*153 (3)*	55.2	*422 (1)*	

learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

% ROP in entrepreneurship	9.5	*4*	117	89.3	*57 (11)*	57.4	*153 (2)*	
% ROP in human capital and social care	41.2	*4*	110	105.7	*101 (4)*	46.1	*80 (11)*	
% ROP in environment	27.9	*8*	90	93.0	*152 (1)*	57.1	*168 (1)*	
% ROP in transport	13.9	*9*	81	187.0	*235 (1)*	60.9	*139 (3)*	
% ROP in technical support	2.0	*11*	97	21.0	*38 (13)*	13.1	*38 (13)*	

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020).

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 6.1 billion euros of total public expenditure for funding approved projects to date) allocated to Attica by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[21]. Table 1.10 shows that the SOPs of ESPA devote to Attica a relatively higher share to environment followed by entrepreneurship, lower shares to human capital and social care and even lower (below of 10%) in research and technology and in transport. These programs also warrant some resources for the restructuring and modernization of public administration in Attica (0.7%) (Table 1.10).

Table 1.10. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Attica

Indicator	Regional indicator							
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*	
ESPA budget total (€), 2014-2020	6,092,933,899.53	*1*	23.93[a]	72.8	*98 (8)*	39.0	*101 (8)*	
% ESPA in research and technology	7.8	*10*	78	55.0	*111 (3)*	21.2	*105 (7)*	
% ESPA in entrepreneurship	30.1	*5*	114	98.5	*102 (2)*	53.7	*116 (1)*	
% ESPA in human capital and social care	16.5	*12*	69	134.3	*144 (2)*	70.8	*140 (2)*	
% ESPA in environment	40.4	*2*	160	33.7	*70 (12)*	19.1	*71 (11)*	

[21] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

% ESPA in transport	2.5	*12*	25	33.7	*57 (11)*	19.6	*53 (12)*	
% ESPA in administration	0.7	*12*	46	73.0	*101 (4)*	34.1	*100 (8)*	
% ESPA in technical support	2.0	*12*	77	89.3	*100 (9)*	54.6	*103 (1)*	

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (2020) data accessed on 5/3/2020

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection results by the combined allocation of funds in both the ROP of Attica and the SOPs (considering the funds for Attica therein). Table 1.11 shows that relevant resources are available in the ROP for human capital and social inclusion (432.5 million euros). Most of these funds are addressing social inclusion actions (355 million euros), a smaller share is for education and lifelong learning (56 million euros) and actions supporting employment (20.4 million euros). However, as it is shown in Table 1.12, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively good in terms of contracted share that reaches almost 72% whereas payments are still low, just 31% of the budget.

The ROP budget also reserves 100 million euros to smart specialization, an amount that mainly supports investments by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action has been contracted at 91.1% but has been paid for 58.5%. In addition to the funds allocated in the ROP, Attica receives a significantly larger amount from the Sectoral Programs in these fields.

Table 1.11. The funds of the ROP of Attica for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	432,518,759.00	637,240,886	457,046,183	71.7	199,345,517	31.3
Employment	20,433,244.00	4,829,000	3,216,693	66.6	1,302,000	27.0
Education and Lifelong Learning	56,544,108.00	88,280,595	38,062,716	43.1	18,990,292	21.5
Social Inclusion	355,541,407.00	544,131,291	415,766,774	76.4	179,053,224.86	32.9
Innovation	58,230,879.00	47,130,956	40,976,459	86.9	32,135,247	68.2
Research Technology Innovation	22,230,879.00	9,725,200	7,992,246	82.2	5,193,675	53.4
Information and Communication Technologies	36,000,000.00	37,405,756	32,984,213	88.2	26,941,571	72.0
Smart Specialization	100,000,000.00	98,040,298	89,335,298	91.1	57,370,281	58.5
SME's Competitiveness	100,000,000.00	98,040,298	89,335,298	91.1	57,370,281	58.5

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Table 1.12 shows that Attica receives from the respective SOPs more than 1 billion additional euros for human capital and social inclusion, 1.8 billion euros for Smart Specialization and 473 million euros for

Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the latter has been implemented at the regional and local level in a more place-based approach. Implementation of the skills sectoral programs is pretty high, since more than 100% of the budget is being contracted, with an overbooking of 34%, and 70.8% already spent.

In addition, the analysis of the programming and implementation figures shows that the SOPs devote significant funds on innovation and ICT that have a satisfactory degree of contracting (55.0%), but a lower expenditure (21.2%).

The gap between contracting and spending is explained by a number of factors. Most common factors are (i) the late start of the programs (most of them launched in 2017), (ii) cumbersome administrative procedures, (iii) but also the actual time that an R&D or innovation project needs in order to be completed. The total amount of funding indicates that innovation policies are mainly supported by the SOPs where the budget is much higher. However, it is worth to consider that most part of the budget in these programs is directed to ICT infrastructure.

Finally, the funds allocated to Smart Specialization are business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is by 98.5% contracted, whereas again payments and absorption are still low (53.7%). One of the reasons for the slow implementation of the investment projects is the weak banking sector. Most investors face difficulties to get a loan or a guarantee from their banks, therefore they have to complete their investments with their own financial means.

A critical issue relates to the level of funding in the ROP. The most important development opportunities in the region are the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, as well the development of clusters and value chains of local export oriented firms. To seize these opportunities, investments in R&D and innovation policies are required and a significant part of these policies has to be place-based. According to the findings of the survey, the structural funds would have had a greater impact on the regional economy if more emphasis were placed on cooperation between the region's productive and scientific base on innovative actions promoting smart specialization.

Table 1.12. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Attica

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		1,005,217,927	1,349,517,213	134.3	711,300,671	70.8
Employment		505,757,045	482,183,025	95.3	341,210,725	67.5
Education and Lifelong Learning		359,173,796	728,166,687	202.7	241,177,146	67.1
Social Inclusion		140,287,086	139,167,500	99.2	128,912,800.00	91.9
Innovation		473,819,202	260,675,631	55.0	100,533,421	21.2
Research Technology Innovation		297,961,766	167,593,429	56.2	74,508,162	25.0
Information and Communication Technologies		175,857,437	93,082,202	52.9	26,025,259	14.8
Smart Specialization		1,831,330,202	1,804,266,954	98.5	982,877,154	53.7
SME's Competitiveness		1,831,330,202	1,804,266,954	98.5	982,877,154	53.7

Note: *There is no predefined commitment for each region.
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Attica is the largest and most developed regional economy in Greece, although still below the EU average and with a high rate of unemployment. The economy of Attica includes a small primary sector, a noteworthy secondary sector, and a large tertiary sector. The primary sector is, mainly, based on agriculture and livestock and exhibits low levels of relative productivity. The secondary sector is, mainly, based on labour-intensive industries (such as printing and publishing, on capital-intensive industries (such as transport equipment), on resource-intensive industries (such as coke and petroleum) and on knowledge-intensive industries (such as pharmaceutical products, chemicals, electronic equipment and optical instruments) and exhibits satisfactory levels of relative productivity. The tertiary sector is, mainly, based on information and communication technologies, on professional, scientific and technical activities, on financial and insurance activities, and on administrative and support services, and exhibits modest levels of relative productivity. Attica has, apparently, the opportunity to further stimulate the competitiveness and extroversion of its economy. This study identifies opportunities in three main areas for Attica to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy.
2. Pursuing an innovation-oriented and knowledge-intensive regional society.
3. Enhancing the performance and impact of EU Structural Funds.

Strengthening and diversifying the productive base of the regional economy

Attica specializes in information and communication technologies, in professional, scientific and technical activities, in financial and insurance activities, and in administrative and support services, and it has highly diversified economic base. Attica has a relatively more innovative economy, has significant value chains, and characterizes for high export and high regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Develop start-ups in the fields of ICTs, bio-food, bio-health, agro-technology, social economy, circular economy or other cutting-edge industries with the support and cooperation of Research Laboratories, Incubators and Entrepreneurship and Innovation Centres.
2. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region.
3. Protect the environment and cultural, architectural, and historical heritage, improving local quality features and services and highlighting quality of life in a strong advantage that is going to attract new residents to the region.
4. Support the development of new industrial sectors in which the region can develop a comparative advantage based on a development plan that seeks to diversify the production base through targeted and coordinated policies at the local and regional level.
5. Transform the region into an academic destination by developing strong Universities, but also University infrastructure and services, to attract students and scientists from other regions and other countries to study, research and work, highlighting Higher Education in an important industry for the region.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Attica is faced with significant challenges in terms of improving the innovative capacity of its productive sectors. Despite the fact that the performance of Attica in terms of innovation indicators improved during the last decade, the region has, still, significant room for improvement in many aspects,

e.g. the need to be more business-driven. The current ROP of Attica allocates a satisfying amount of funds for R&D and innovation actions (approximately 58 million euros), whose implementation, however, is still in delay although improvements can be signalled in 2020.

The fact that the National and Kapodistrian University and the National Technical University of Athens appear in the Times Higher Education (Times Higher Education, 2019) global ranking in the 501-600 and the 601-800 ranking category, respectively indicates that there are significant possibilities for the production of relatively high-quality research in the region, which can be the base for science-business cooperation and the development of local innovative products and services. This is a highly sensible strategy, as Attica accounts for more R&D expenditure than all the other Greek regions put together (EC, 2019).

Attica needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the Universities in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles still exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This is a major improvement that has already resulted in an increase in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

1. Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Attica needs to build further on the existing experience of the administration, the Universities, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
2. Address the issue of ‘ownership’ of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Attica needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
3. Enhance the science-business collaboration in Attica, making a better use of the available funds for industrial research and innovation. Attica (including its satellites) hosts the richest production, but also research, ecosystem in the country and can build on the experience of these actors in successfully applying to the calls of the SOPs and engaging in a joint implementation of a large number of applied research and R&D projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, which potential is not fully exploited because of the average delayed progress in the implementation of the Regional Development Program (ROP) and to some extent also of the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs projects are complementary to the corresponding ROP projects, in the sense that they do not cover the same type of actions, in Thematic Objective 5 (promoting climate change adaptation, risk prevention and management), Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), Thematic Objective 7 (promoting sustainable transport and removing bottlenecks in key network infrastructures) and Thematic Objective 9 (promoting social inclusion, combating poverty and any discrimination). In contrast, the centrally-implemented SOPs projects tend to compete with the ROP

projects, either because of time overlapping calls or because they support similar actions, in Thematic Objective 1 (strengthening research, technological development and innovation), Thematic Objective 2 (enhancing access to, and use and quality of, ICT), Thematic Objective 3 (enhancing the competitiveness of SMEs), Thematic Objective 4 (supporting the shift towards a low-carbon economy in all sectors) and Thematic Objective 10 (investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure).

To enhance the overall performance and impact of the Structural Funds in Attica, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit in full the ROP sub-program for Research and Technology that is not being activated yet. Noteworthy that some regional stakeholders consider the design of the RIS3 quite satisfactory, but not timely implemented according to the plan and the business needs.
2. Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agri-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.
4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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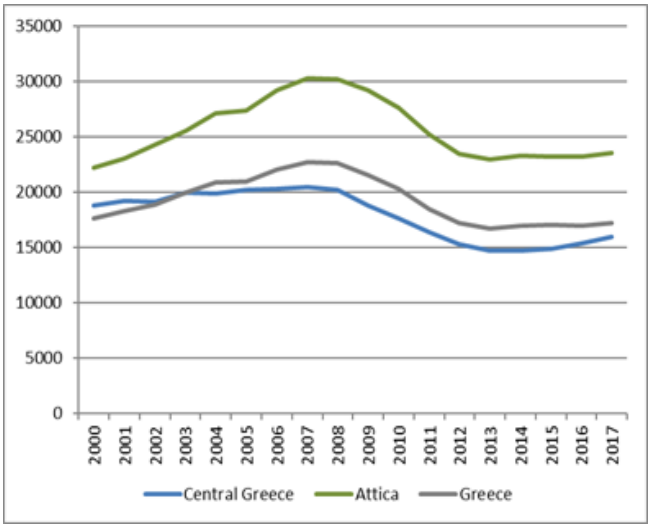
2 Central Greece

Figure 2.1. Location of the region of Central Greece

Figure 2.2. GDP per capita in Central Greece (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020.

Local Government, Geography and Demography

The region of Central Greece is located in the central part of mainland Greece. It borders with Thessaly on the North, Western Greece on the West and Attica on the South. The city of Lamia is the capital of the Regional Administration of Central Greece. The region is part of the Decentralized Administration of Thessaly and Central Greece. The major cities of the region of Central Greece are: Amfissa, Chalkida, Karpenisi, Istiea, Karystos, Lamia, Levadia, Nea Artaki, Orchomenos, Psachna, Thiva, Vasiliko. The region includes five regional units. Moreover, the region is divided into 25 municipalities covering urban, rural and island areas. (Table 2.1).

Central Greece is the eighth most populated region of Greece with 555,623 inhabitants in 2018, and the eighth most urbanized. While Lamia is the administrative centre of the region, the city of Chalkida, has a greater population size. Moreover, Chalkida is a major port city and a significant industrial hub at the regional level. The region has experienced a modest increase in population in the post-2008 period and a corresponding trend in its population density, which is significantly lower than the national and the EU average. The share of population (25-64 years) with tertiary education is 23.3%, which is below the national

and the European average. The population of the region lives predominantly in cities, as the urbanization rate is 58.3%, a value that is, however, below the national average.

Table 2.1. Information on the administrative structure of the region of Central Greece

Regional Administration	A Governor and a Regional Council are elected directly in Central Greece for a 4-year term.
Decentralised administration	Central Greece belongs to the Decentralized Administration of Thessaly and Central Greece. The capital of the Decentralized Administration is the city of Larissa.
Regional units (population)	Evoia (209,930), Evritania (29,080), Fokida (43,672), Fthiotida (159,461), Viotia (117,314)
Municipalities	The Region of Central Greece has 25 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Lamia with a population of 51,559 inh. (year 2011).
Other major cities (inhabitants)	Chalkida (58,349), Thiva (22,568), Levadia (21,392), Nea Artaki (9,358), Amfissa (6,855), Vasiliko (6,438), Karpenisi (6,137), Psachna (5,768), Orchomenos (5,248), Karystos (5,096), (year 2011)
Regional institutions in South Aegean	University of Thessaly National and Kapodistrian University of Athens Agricultural University of Athens Regional Association of Central Greece Municipalities Evoias Development Agency S.A. Central Greece Development Organization S.A. Elikonas Parnassos Development Agency S.A. Fthiotida Development Agency S.A. Fokida Development Agency S.A.

Source: ELSTAT (2019) OECD (2019b).

Ageing in Central Greece is an important issue as the share of population over 70 years old is higher compared to the Greek or EU levels and has also increased significantly (2.9%) during the crisis.[22] This is also verified from the elderly dependency ratio that, in 2019, was at the level of 37.4%, above the national average. (Table 2.2). Finally, the index of crude rate of net migration for the region of Central Greece, is one of the highest in the country (3rd place) and has slightly increased (by 0.4%) over time.

Table 2.2. Indicators for the population characteristics of the region of Central Greece

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	555,623	*8*	5[a]		0.00	*4*
Population share (%) in the country, 2017	5.2	*8*			2.8	*4*
Population density (inh/km^2), 2018	35.7	*12*	44	30	0.00	*4*
(%) Population >70, 2011	17.2	*5*	116	130	2.9	*5*
Youth Dependency Ratio[b], 2019	22.03	*10*	98		-0.17	*8*
Elderly Dependency Ratio[b],	37.42	*5*	108		0.90	*12*

[22] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

2019						
(%) Population (25-64 years) with tertiary education [e]	23.3	*11*	75	74	5.4	*2*
Urbanization ratio, 2011	58.3	*8*	76		0.1	*9*
Crude rate of net migration[d], 2017	4.9	*3*			0.4[c]	*3*

Note: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011.
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

Central Greece appears to be producing a very large part of the country's industrial product and, as a result, it is one of the most developed regions in Greece. The sectoral share of industry in GDP in Central Greece (38%) is more than 2 times the national average, and about 1.5 the European average, while the share of employment is also high (21%). The relative productivity of the secondary sector is also very high.

The roots of this phenomenon go back to the 1980s, when the Greek State, in order to relieve Attica from industrial concentration (and environmental pollution), effectively deterred the implementation of new investments outside the regional borders of Attica, with a mix of restrictions and incentives provided by the Investment Laws. This led to the establishment of new investment as well as relocation of existing firms to Central Greece. (Table 2.3).

Table 2.3. Indicators of the regional economy of Central Greece

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	7.7	*7*	189	498	1.9	*10*
(%) Secondary in GDP, 2016	38.1	*2*	224	153	0.7	*3*
(%) Tertiary in GDP, 2016	54.2	*12*	69	73	-0.7	*12*
(%) Primary in Employment, 2015	19.8	*5*	185	416	0.4	*4*
(%) Secondary in Employment, 2015	21.4	*2*	164	99	-3.1	*4*
(%) Tertiary in Employment, 2015	58.7	*13*	77	80	1.2	*6*
(%GDP)/(% Employment) Primary, 2016	0.4	*9*	102	120	1.7	*12*
(%GDP)/(% Employment) Secondary, 2016	1.8	*3*	137	155	4.4	*6*
(%GDP)/(% Employment) Tertiary, 2016	0.9	*12*	89	92	-2.2	*11*

Source: Sources: OECD (2019a), ELSTAT (2019).

Over time, the area witnessed the build-up of the highest industrial concentration in the country right outside the regional borders of Attica. This, however, took place without an organized development plan (a fact reflected in acute environmental problems), bringing to the area a large number of jobs but not necessarily the incomes that would correspond to this concentration (due to important employment commuting from Attica). The overall data show that the industrial concentration in the region is in scale-intensive activities.

The region has a relatively large primary sector in terms of GDP (7%) and employment (19%), however, the relative productivity of this sector is very low, although it is close to the national and above the EU average figure.

The tertiary sector in Central Greece has relatively one of the lowest shares in GDP (54%) and employment (58%) and relative productivity in Greece.

Central Greece is probably a unique case in the EU-28, in that the significantly higher GDP per capita is not found in the Region's capital or in one of its major urban centres but in a former rural area of the Region (near the Attica borders). An additional particularity of Central Greece is that people commute to work not from the suburbs to the urban centre but the way round, and there are extensive commuting flows from the neighbouring Attica region.

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Central Greece has developed a strong specialization (with LQ>2) in manufacturing, and a slight lower in agriculture (value of LQ is 1.19). (Table 2.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive fabric of the region leads to an export structure with strong or significant specializations (RCA>1.25) in scale-intensive sectors (Table 2.4).

At a more disaggregated level (NACE2), the region presents a modestly diversified production base, as it has developed some level of specialization in 16 (out of 38) branches (Table 2.4). Strong specialization exists in mining, paper, plastic, basic metals and electrical machinery. Modest to high specialization is exhibited in agriculture, food, non-metallic minerals and metal products, while weak to modest specialization exists in wood, chemicals, motor vehicles, water supply, construction and tourism. The region exhibits overall specialization in 14 tradable branches.

Table 2.4. Sectoral specialisation in the region of Central Greece

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	1.19	*5*		
LQ in mining, energy, electricity, water supply, 2016	0.95	*3*		
LQ in manufacturing, 2016	2.71	*1*		
LQ in construction, 2016	0.82	*10*		
LQ in distr. trade, transport, accom., food serv., 2016	0.71	*12*		
LQ in information and communication, 2016	0.58	*10*		
LQ in financial and insurance activities, 2016	0.66	*13*		
LQ in professional, scientific and technical act., 2016	0.6	*13*		
LQ in administrative and support services, 2016	0.72	*11*		
LQ in other services, 2016	0.77	*12*		
RCA[b] in agricultural sector, 2012	0.7	*4*	2.1	*8*

RCA in resource-intensive sector, 2012	0.7	*4*	-1.6	*6*
RCA in labour-intensive sector, 2012	0.4	*8*	-0.1	*9*
RCA in scale-intensive sector, 2012	2.6	*1*	5.5	*3*
RCA in specialized supplier sector, 2012	0.5	*7*	-14.4	*9*
RCA in science-based sector, 2012	0.2	*5*	15.9	*3*
Diversification of productive base [c], 2011	16 (5/*14*)	*3*		
Sectors with regional multiplier effects >1[d], 2011	1(0/*0*)	*11*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Source: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

The region could take advantage of its modestly diverse production base so to develop value chains through local forwards and backwards linkages, especially branches in which the region exhibits specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers.[23] Only one branch appears to have regional multiplier greater than one, and it is not a tradable branch, nor a branch in which the region counts in terms of specialization. Given the size of the production base and its diversity, it is very strange that local linkages are practically absent and multipliers so small. To some extent, this is explained by the satellite character of the industrial cluster outside the Attica borders, which indicates that most factories and branches in Central Greece have active forward and backward linkages with factories or business in Attica, as they belong to the same production system. They do not develop linkages to each other, as they are already linked in a radial way to the core production system in Attica. This implies that increase in demand may be channelled both to the local production base, but also to production in the core system of Attica.

Regional performances and current trends

Central Greece is generating 4.7% of the National GDP being the 5th largest regional economy in Greece. Its development level, in GDP per capita terms, is close to the national average (90%), but very low compared to the EU average (60%). Both GDP and GDP per capita have declined during the last decade by 3.2%, experiencing a high drop in welfare levels. The region is experiencing a high unemployment rate (19.2%) which is dramatically higher than the EU average (274%), but below the national average (98%). Unemployment on average has increased by 8.2% during the last decade, while the employment ratio has declined by 1.4%. The productivity level in Central Greece is one of the highest in the country holding the third position among the Greek regions, but it is significantly lower compared to the EU figure (64.5%). It has declined in the post-2008 period by 1.0%, which is one of the smallest drops among regions.

Table 2.5. Indicators of development, competitiveness and welfare for the region of Central Greece

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	*National*	National	EU=100	OECD	Annual	*National*

[23] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

		Rank	average = 100 (national share)			change (%)	*Rank*
GDP, 2016 (constant 2010 prices, ml. €)	8,674	*5*	5[a]			-3.2	*5*
GDP per capita, 2016 (€/inh.)	15,606	*4*	90	60	57%	-3.2	*6*
GDP share (%) in the country, 2017	4.7	*5*				5.6	*3*
Employment share (%) in the country, 2017	5.01	*8*				0.60	*6*
(%) Employment/Population, 2018	40.5	*9*	97	95		-1.4	*7*
(%) Unemployment, 2018	19.2	*7*	98	274	20[d]	8.2	*5*
Productivity (GVA/worker, thousand €), 2017	37.7	*3*	94.1	64.5[c]		-1.0	*3*
Merchandise exports to GDP ratio, 2016	12.6	*5*	89	38		3.1	*12*
Regional Innovation Scoreboard, 2017	53.8	*9*		52		0.9[b]	*4*

Note: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018).
Source: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

The region shows some progress towards a more extrovert economy, as regional merchandise exports are equal to 12.6% of GDP and have increased by 3.1%, placing Central Greece in the 5th and 12th place in the respective figures. Despite this slight improvement in their exports as a share of GDP, the figure is still below the national average (94%) and about 2/3 the EU average (64%). Central Greece has a low performance, that equals to just 52% of the EU average, in the European Regional Innovation Scoreboard, ranking 9th among Greek regions. Its performance has improved during the last decade by 0.9%, which is the fourth better position among the Greek regions. (Table 2.5).

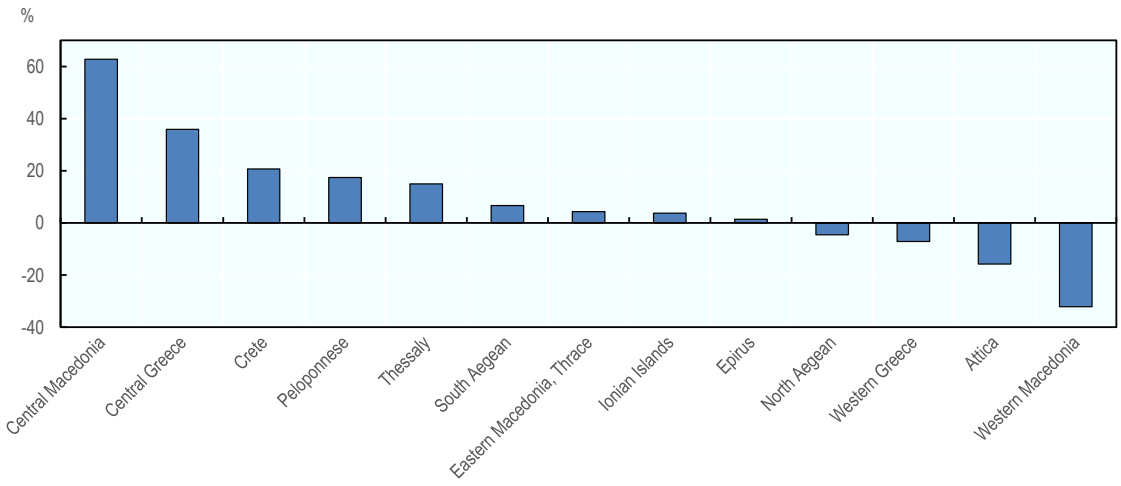
Central Greece is facing significant social problems as almost 6% of the population of the region does not have access to health services, 74.3% of jobless people are long-term unemployed, and 18.9% of the young people in the age group 15-24 are excluded from education or the labour market. Moreover, the share of population in danger of poverty and social exclusion is more than 31% (Table 2.6). Between 2015 and 2017, Central Greece contributed to the growth of national GDP by about 35.9% (Figure 2.3).

Table 2.6. Social indicators for the region of Central Greece (2018)

Social indicator (year)	Greece	Central Greece
Share of population with lack of access to health services	8.80	6.1
Long-term unemployment	70.3	74.3
Youth aged 15-24 excluded from education or the labour market	14.1	18.9
Share of people in danger of poverty or social exclusion	31.8	31.1

Source: Eurostat (2019b).

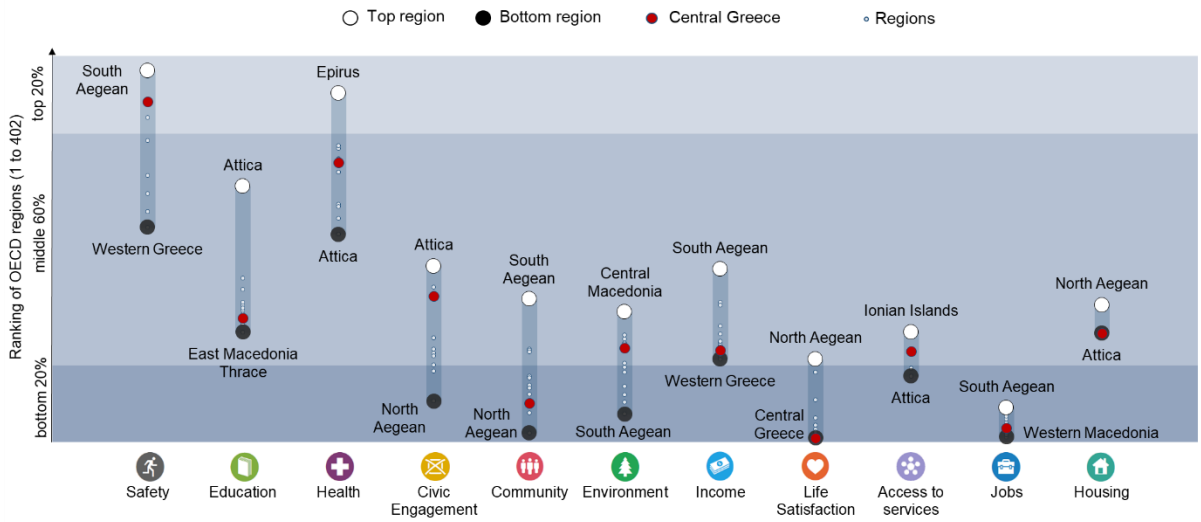
Figure 2.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Central Greece is varying in a number of well-being indicators estimated by OECD (2019c, Figure 2.4 and Table 2.7). Compared to 402 OECD regions, Central Greece belongs to the high 20% group in safety, it belongs to the middle 60% group in the fields of education, health, civic engagement, environment, income, access to services, and housing. Compared to the other OECD regions. Central Greece has very low scores in terms of community, life satisfaction, and jobs. When compared to the other Greek regions, Central Greece is above the national average in safety, health, civic engagement, environment, and access to services, close to the national average in jobs, and housing, and towards the bottom end of the scale in terms of all other indicators.

Figure 2.4. Regional well-being indicators for Central Greece



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 2.7. Individual well-being indicators outcomes in Central Greece and Greece

	Country Average	OECD median region	Central Greece
Safety			
Homicide Rate (per 100 000 people), 2016	0,8	1,3	0,4
Education			
Labour force with at least upper secondary education (%), 2017	76,7	81,7	68,5
Health			
Life Expectancy at birth (years), 2016	81,5	80,4	81,8
Age adjusted mortality rate (per 1 000 people), 2016	7,5	8,1	7,1
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63,6	70,9	65,7
Community			
Perceived social network support (%), 2013	81,1	91,4	77,7
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18,4	12,4	18,0
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	11 372
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5,6	6,8	4,8
Access to services			
Households with broadband access (%), 2017	65,0	78,0	67,0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53,7	67,7	53,1
Unemployment rate 15 to 64 years old (%), 2017	21,8	5,5	21,2
Housing			
Rooms per person, 2016	1,5	1,8	1,5

Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333,500 people and generates around € 7.2 billion in GVA.

According to the national Special Framework for Spatial Planning and Sustainable Development of Aquaculture, in the region of Continental Greece there are five areas planned to become AZA (Allocated

Zones of Aquaculture)[24] that includes already existed PAY (areas dedicated to the development of aquaculture activity).[25]

There are no big ports in Continental Greece, but there are about 22 medium-small ports with a movement of cargo and passengers (ferry) ships.

Regarding the Fisheries sector, the professional fishing fleet in the Continental Greece Region represents about 10% of the national fleet. It is mainly formed by small, coastal fishing vessels, while there are also some medium and overseas fishing vessels. According to the National Fisheries Data Collection Program (EPSAD - Final Report 2014 - part B), in 2014 there were 1 582 professional fishing vessels in the Continental Greece with a capacity of 8 363 GT (Gross Tonnage) and 53 990 KW engine power.

There are no big ports in Continental Greece, but there are about 22 medium-small ports with a movement of cargo and passengers (ferry) ships.

For what concern tourism, according to the 2018 Annual Report by the Greek Tourism Confederation (SETE), the revenues for Continental Greece in 2018 represented 1% (€194 million) of the total revenues of the country, visitors reaching 2% (about 549 000) of the total visitors in Greece. Additional growth potential for maritime tourism in Continental Greece is in the Sailing & Yachting sector and the cruise sector, also facilitated by the presence of Delphi archaeological site.

Enabling Factors

Transport, health and digital infrastructure and environment

Geography advantages the region of Central Greece, as it is located on the main development axis of the country. However, its transport infrastructure, as the relevant indicators show, is below the national average and (in a number of them) among the last places among regions. In terms of road density, Central Greece is one of the less equipped regions as it holds the 11th position, but in freight transport it holds the second position among Greek regions due to the large industrial production.

[24] The first AZA includes the PAY B3 Eratini - B4 Galxidi and B5 Antikira, the zones are inside the prefectures of Fokis kai Viotia. The AZA has 6 zones of 29,974,670 square meters with a yearly production capacity of 32,160 tons of Mediterranean fish species. The second AZA includes the PAY B6 Vourlia (Viotia Prefecture). The AZA has 3 zones (2 for production and 1 for fallow) of 2,475,740 square meters with a yearly production capacity of 16,545.88 tons of Mediterranean fish species. The third AZA includes the PAY A.12 and A.13 in Larymna and Atalanti (Phthiotis Prefecture). The AZA has 5 zones for production and 5 for fallow of 16,688,950 square meters with a yearly production of 31,178.13 tons of Mediterranean fish species. The fourth AZA includes the PAY A.14 and A.15 in Maliakos Basin and the Oreon Channel (Phthiotis Prefecture). The AZA has 2 zones for production and 1 of fallow of 10,332,582 square meters with a yearly production capacity of 10,792.5 tons of Mediterranean fish species. The fifth AZA includes the PAY A.11, A.15, and B8 in N. & S. Evoikos Basin and the Oreon Channel (Phthiotis Prefecture). The AZA has 15 zones for production of 22,710,000 square meters with a yearly production capacity of 47,715 tons of Mediterranean fish species.

[25] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

In terms of air and marine transport, the region although there are enough available infrastructures does not have a noteworthy traffic. None of the airports or ports belongs to the core network in the European scale (one airport and one out of twenty-one ports has a comprehensive position in the Trans European Transport Network). Worth to note that the economic crisis has affected negatively both maritime and freight transport.

Similarly, in terms of health infrastructure, the region holds the last position in the country with respect to the number of hospital beds per inhabitant, a fact that also the neighbour presence of Attica affects. .

Finally, air pollution in Central Greece is significantly lower compared to the other regions (13th place), a value that has declined over the last decade (Table 2.8).

Table 2.8. Indicators of infrastructure for the region of Central Greece

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km^2 (km/100 km^2), 2018	26.7	*11*	88		
Commercial airports	1(*1*)[c]	*10*	3[a]		
Passengers in air transport/1000 inh, 2016	0.0	*13*	1	10	*13*
Commercial ports	21(*1*)[c]	*2*	17[a]		
Passengers in maritime transport/1000 inh, 2016	2.5	*9*	84	-8.9	*12*
Road freight transport (thousand tons/inh), 2017	74.5	*2*	161	-13.4[b]	*12*
Hospital beds/10,000inh., 2015	17.2	*13*	40.6	-1.3	*5*
Air Pollution in PM2.5 (µg/m^3), 2017	12.7	*13*		-2.3	*9*

Note: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Source: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In Central Greece, the figures show that R&D-related expenditure is low, compared to the national average in all the sub-categories and especially in the tertiary education sector in which the region holds the last position (Table 2.9). However, an increase in the expenditures during the crisis period is witnessed.

Table 2.9. Indicators of innovation and development policies for the region of Central Greece

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	70.7	*8*	44	7.9 [b]	*2*
R&D Expenditure in firms (€/inh), 2016	51.0	*3*	75	13.2[b]	*7*
R&D Expenditure in public sector (€/inh), 2016	11.7	*12*	29	11.6[b]	*8*
R&D Expenditure, tertiary education (€/inh), 2016	7.9	*13*	15	11.0[b]	*1*
Patent applications per million inhabitants, 2015	1.8	*10*	19	-4.0	*4*
Public Investment (€), 2017	113,502,137	*8*	4[a]	-5.3	*9*
Public Investment per capita (€/inh), 2017	204.2	*10*	73	-5.3	*10*
% ESPA allocated to the region	5.6	*7*			
% National Rural Development Program allocated to the region	7.6	*7*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Source: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020).

Interestingly, R&D expenditure in firms is high due to the large concentration of industrial firms in the borders with Attica, while higher education has a very poor performance, due to the lack of significant academic institutions until recently.

In terms of patent applications per million inhabitants, Central Greece holds the tenth position in the country that is well below the national average indicating a significant gap with the first runner (Attica). The index has declined during the crisis period (2008-15), showing a difficulty of local industrial base to innovate.

Public Investments and European Structural Funds in Central Greece

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is an indication of the commitment of the State to regional cohesion and balanced growth. Central Greece receives 4% of the Public Investment national budget against a population share of 5% and a GDP share of 4.7%. As a result, the per capita figure is lower compared to the national average (Table 2.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is partially aligned to the economic characteristics of the region, as Central Greece receives only 3.66% of the amount of ESPA allocated to Regional

Operational Programs in Greece and about 6.0% of the total amount of ESPA. This is because Central Greece was not considered as an Objective 1 Region by the European Regulations at the beginning of the programming period. Central Greece has also received 7.65% of the Rural Development Program (Common Agricultural Policy), a figure that is the seventh highest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 2.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Central Greece includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[26] that define the development strategy of the Region. The Vision of the region is "the balanced economic and social development of the region through the improvement of the business and investment environment, respecting the environment and the citizen".

The strategic Objectives are:

- Promoting entrepreneurship, competitiveness and making the regional economy more extrovert
- Ensuring the quality of the environment, promoting sustainable development and improving the quality of life.
- The completion of transport infrastructure and networks
- Upgrading human resources and enhancing employment and social cohesion.
- Improving administrative capacity
- Promoting territorial cohesion and cooperation

The Regional Operational Program (ROP) of Central Greece is about 193 million euro (Table 1.9), in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than half of these funds are directed to human resources development and protection (55%) while a substantial amount is directed to environmental (20.7%) projects or actions. A relatively smaller amount is available for actions in support of transport (8.9%), entrepreneurship (7.1%) and for research and technology (5.8%) (Table 2.10).

Compared to the average share, the ROP of Central Greece assigns more resources to human capital and social care (154%), research and technology (131%) and less to entrepreneurship (75%), transport (69%) and environment (68%).

The progress in the implementation of the ROP is relatively good in terms of contracted operations, about 79.4% of the budget of ROP (by December 2020) but still lagging behind in terms of implementation, since just 47% have been actually spent. The worst progress in the implementation process in terms of spending is observed in research and technology (actually, the specific actions have not yet been activated) in the entrepreneurship (21.7%) and transport (28.9%) priorities, and the best (62.7%) in the human capital and social care. Despite the ranging progress, deviation from the overall performance of the ROPs is limited, with the exception of research and entrepreneurship sub-programs (Table 2.10).

[26] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

Table 2.10. Indicators for the Regional Operational Programs of the region of Central Greece

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP total budget. (Public expenditure) (€), 2014-2020	193,228,396	*12*	3.66[a]	79.4	91 (9)	47.0	107 (4)	
% ROP in research and technology	6.1	*3*	135	0.0	0 (13)	0.0	0 (13)	
% ROP in entrepreneurship	6.8	*8*	83	107.6	69 (8)	21.7	58 (12)	
% ROP in human capital and social care	55.3	*1*	148	102.6	98 (8)	62.7	109 (5)	
% ROP in environment	20.7	*12*	67	53.5	88 (9)	35.5	105 (5)	
% ROP in transport	8.9	*12*	52	36.5	46 (12)	28.9	66 (9)	
% ROP in technical support	2.3	2	113	47.0	86 (8)	43.0	125 (4)	

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (accessed 3 December 2020).

ESPA Sectoral Operational Programs

The resources of the ROP are matched by significant funds (about 1.52 billion euros in terms of total public expenditure for funding approved projects to date) allocated to Central Greece by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[27].

Table 2.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Central Greece

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-	1,521,342,479.88	*6*	5.97[a]	73.8	*100 (7)*	40.1	*103 (6)*

[27] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

2020							
% ESPA in research and technology	7.4	*12*	75	53.0	*107 (5)*	16.3	*81 (11)*
% ESPA in entrepreneurship	16.2	*12*	61	94.2	*98 (11)*	38.3	*83 (13)*
% ESPA in human capital and social care	22.5	*9*	94	76.5	*82 (8)*	43.6	*86 (9)*
% ESPA in environment	22.7	*7*	90	42.1	*87 (10)*	24.5	*91 (9)*
% ESPA in transport	27.5	*2*	268	90.2	*153 (2)*	56.7	*152 (2)*
% ESPA in administration	1.4	*8*	88	72.0	*100 (6)*	38.4	*113 (2)*
% ESPA in technical support	2.3	*9*	86	89.5	*100 (7)*	51.2	*96 (12)*

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020).

Table 2.11 shows that the SOPs of ESPA directed to Central Greece devote a relatively higher share to transport, and less shares to human capital, research and technology, environment and entrepreneurship. These programs also reserve some resources for the restructuring and modernization of public administration in Central Greece (1.4%).

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is the combined allocation of funds in both the ROP of Central Greece and the SOPs. Table 2.12 shows that resources are available in the ROP for human capital and social inclusion (107 million euros). Most of these funds are addressing social inclusion actions (91 million euros), a smaller share is for education and lifelong learning (10 million euros) and actions supporting employment (6 million euros). However, as resulting in Table 2.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 88% and payments 54% of the budget.

Table 2.12. The funds of the ROP of Central Greece for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	106,788,544	124,233,930	109,556,872	88.2%	66,964,094	53.9%
Employment	5,715,202	-	-	-	-	-
Education and Lifelong Learning	9,987,270	12,026,101	9,021,822	75.0%	4,380,644	36.4%
Social Inclusion	91,086,072	112,207,830	100,535,050	89.6%	62,583,449.87	55.8%
Innovation	11,701,932	8,175,750	-	0.0%	-	0.0%

Research Technology Innovation	5,194,716	8,175,750	-	0.0%	-	0.0%
Information and Communication Technologies	6,507,216	-	-	-	-	-
Smart Specialization	13,071,652	14,065,141	14,065,141	100.0%	2,841,857	20.2%
SME's Competitiveness	13,071,652	14,065,141	14,065,141	100.0%	2,841,857	20.2%

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

Moving to R&D, Central Greece is characterized by a weak performance as highlighted in the introductory paragraph. Its R&D expenditure per capita is just 44% of the national average, while its expenditure by firms per capita is 75% of the national average. Despite the serious gap, the ROP of Central Greece allocates a relatively small amount to R&D and innovation actions (12 million euros), which in addition has not been activated yet (as of December 2020).

The ROP budget also reserves 13 million euros to Smart Specialization actions, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is fully contracted, but payments are still pretty low (20%).

In addition to the funds allocated in the ROP, Central Greece receives a significantly larger amount from the Sectoral Programs in these fields. Table 2.13 shows that Central Greece receives from the respective SOPs additional 342 million euros for human capital and social inclusion, 247 million euros for Smart Specialization and 113 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the latter has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is relatively satisfactory, as 76% of the allocated budget has been contracted and 44% disbursed.

In addition, the analysis of the programming and implementation figures show that the SOPs devote significant funds on innovation and ICT that have a satisfactory degree of contracting (53%), but a low degree of spending (16%). Finally, the funds allocated to Smart Specialization are business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is by 94% contracted, but again payments and absorption are still low.

Table 2.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Central Greece

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		342,046,607	261,567,579	76.5	149,091,264	43.6
Employment		145,961,425	94,820,310	65.0	64,283,263	44.0
Education and Lifelong Learning		176,223,633	147,036,269	83.4	66,462,401	37.7
Social Inclusion		19,861,550	19,711,000	99.2	18,345,600.00	92.4
Innovation		112,695,270	59,759,878	53.0	18,338,924	16.3
Research Technology Innovation		22,962,322	8,418,436	36.7	3,595,201	15.7
Information and Communication Technologies		89,732,948	51,341,442	57.2	14,743,723	16.4
Smart Specialization		246,587,179	232,237,165	94.2	94,555,913	38.3
SME's Competitiveness		246,587,179	232,237,165	94.2	94,555,913	38.3

Note: *There is no predefined commitment for each region.

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

The gap between contracting and spending may be explained by a number of factors, which include: (i) the late start of the programs (most of them launched only in 2017); (ii) cumbersome administrative procedures; (iii) the lengthy time that R&D and innovation projects takes to be instructed and implemented; (iv) the weak banking sector, which is reluctant to provides loans or guarantee funds for businesses investment.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Central Greece is the 5th largest regional economy in Greece with a level of development close to, but below, the national average and the EU one and a high rate of unemployment. The economy of Central Greece includes a significant primary sector, a strong secondary sector, and a large tertiary sector. The primary sector bases on the agriculture and exhibits low levels of relative productivity. The secondary relies on labour-intensive industries (such as food, and paper), resource-intensive industries (such as plastic, basic metals, and non-metallic minerals) and on capital-intensive products (such as electrical machinery), with high levels of relative productivity. The tertiary sector is, mainly, based on traditional-type industries (such as “mass” tourism), and exhibits low levels of relative productivity. Central Greece faces, apparently, the challenge to regulate the spatial development of manufacturing (spatial plan) along the borders with Attica, given that the latter is, mainly, the outcome of the corresponding restrictions imposed in the neighbouring metropolitan region of Attica in order to deal with major congestion and environmental degradation problems. Most other areas in the region face significant development and catching up challenges. This study identifies opportunities in three main areas for Central Greece to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society
3. Enhancing the performance and impact of EU Structural funds

Strengthening and diversifying the productive base of the regional economy

Central Greece specializes in agriculture and in manufacturing, and it has a modestly diversified economic base. It lags behind in innovative activities, lacks significant value chains, and is characterized by limited export and low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Support the transformation and diversification of primary sector towards quality and organic products and develop a new agro-food sector that exports to specialized and high-income markets.
2. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region.
3. Develop new forms of tourism (gastronomy, agro-tourism, health, cruise, winter, experiences etc.), extent tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.
4. Develop the energy sector through investments in renewable projects, such as solar, wind, hydroelectric and local energy networks, that are going to reduce energy costs in production and make the region a more attractive investment destination as the top development opportunities.
5. Transform local and regional administration into an effective mechanism for supporting economic activities and new investments in the region by preparing appropriate development, spatial and urban plans and formulating appropriate investment licensing policies.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Central Greece faces significant challenges to improve the innovative capacity of its productive sector. Despite the fact that performance in terms of innovation indicators progressed during the last decade, the region still has significant room for improvement. Nevertheless, the current ROP of Central Greece allocates a relatively small amount of funds to R&D and innovation actions (approximately 12 million euros), whose implementation, in addition, is experiencing a serious delay.

Recent legislation established a number of Schools and academic Departments of the National and Kapodistrian University of Athens, the University of Thessaly and the Agricultural University of Athens. The first two appear in the Times Higher Education (Times Higher Education, 2019) global ranking in the 501-600 and the 601-800 ranking category, respectively. This generates possibilities for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of Central Greece is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

Central Greece needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the Universities in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This is a major improvement that already resulted in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

- Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Central Greece needs to build further on the existing experience of the administration, the Universities, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
- Address the issue of ‘ownership’ of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Central Greece needs to better tune the regional Smart Specialization Strategy, in order to make projects and actions more relevant to the real needs and opportunities of the region.
- Enhance the business-science base collaboration in Central Greece, making a better use of the available funds for industrial research and innovation. This can be built on the experience of these actors (especially the Universities, but also some large businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, which potential is not fully exploited because of the relatively modest progress in the implementation of the Regional Development Program (ROP) and the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring the complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs’ projects are complementary to the corresponding ROP’s projects, in the sense that they do not cover the same type of actions, in Thematic Objective 3 (enhancing the competitiveness of SMEs); Thematic Objective 4 (supporting the shift towards

a low-carbon economy in all sectors); Thematic Objective 5 (promoting climate change adaptation, risk prevention and management); and Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency). In contrast, the centrally-implemented SOPs projects are rather competing with than complementing the ROP projects in Thematic Objective 1 (strengthening research, technological development and innovation), and Thematic Objective 2 (enhancing access to, and use and quality of, ICT), either because of the calls at the same time or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in Central Greece, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit the sub-program for Research and Technology that is slowly activated. Many regional stakeholders consider the design of the RIS3 quite satisfactory, but not timely implemented according to the plan and the business needs.
2. Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.
4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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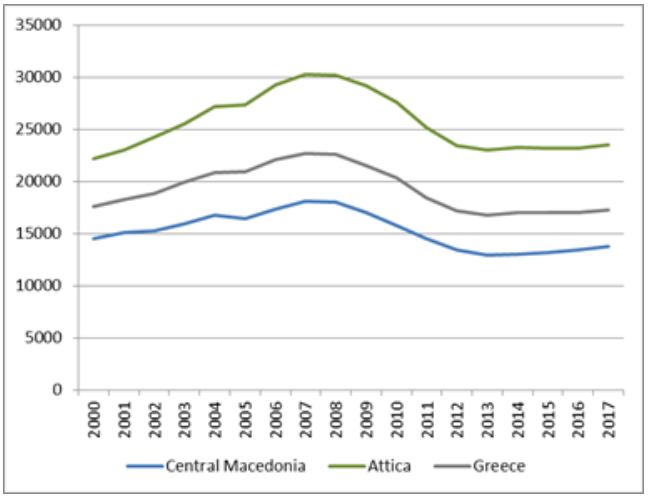
3 Central Macedonia

Figure 3.1. Location of the region of Central Macedonia

Figure 3.2. GDP per capita in Central Macedonia (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

Central Macedonia is located in the north of Greece and borders with Bulgaria and the Republic of North Macedonia. It also includes the Holy Mountain (Agion Oros), an autonomous monastic area. The metropolitan city of Thessaloniki, with about 1,040,000 inhabitants, is the capital of the Regional Administration of Central Macedonia and the Decentralized Administration of Macedonia-Thrace. The major cities in the region are seven: Thessaloniki, Serres, Katerini, Veroia, Kilkis, Poligiros and Edessa which are the centres of the respective regional units; there are three further cities of over 10,000 inhabitants (Giannitsa, Naoussa, and Alexandreia). The region is divided into 38 municipalities, covering urban and rural areas (Table 3.1).

Central Macedonia is the second most populated region of Greece with 1,875,996 inhabitants in 2018, and the second most urbanized with the higher concentration in the metropolitan city of the region. Apart from the metropolitan city of Thessaloniki, the region does not hold any medium-sized city but two small Functional Urban Areas of Serres and Katerini (OECD 2019b). The region has witnessed a slight population decline in the post-2008 period and a corresponding decreasing trend in its population density. However, population density is still higher than the national average but lower than the EU average.

Table 3.1. Information on the administrative structure of the region of Central Macedonia

Regional Self Government	A Governor and a Regional Council are elected directly in Central Macedonia for a 4-year term.
Decentralised administration	Central Macedonia belongs to the Decentralized Administration of Macedonia-Thrace. The capital of the Decentralized Administration is the city of Thessaloniki.
Regional units (population)	Thessaloniki (1,107,998 inh), Serres (176,881 inh.), Kilkis (79,968 inh.), Imathia (140,575 inh.), Pella (139,371 inh.), Pieria (127,478 inh.), Chalkidiki (111,244 inh.)
Municipalities	The Region of Central Macedonia has 38 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The metropolitan city of Thessaloniki with a population of 822,276 inh. (year 2011) and a Functional Urban Area (FUA) of 1,040,000 inh. (2015).
Other major cities (inhabitants)	Serres (57,878), Katerini (55,574), Veroia (43,061), Giannitsa (29,647), Kilkis (22,740), Naoussa (18,641), Edessa (18,302), Alexandreia (14,683), Poligiros (6,116). Serres is a Functional Urban Area with 90,000 inh and Katerini with 90,000 inh.
Regional institutions in Central Macedonia	Aristotle University of Thessaloniki University of Macedonia International Hellenic University Regional Association of Central Macedonia Municipalities Thessaloniki Development Agency Serres Development Agency Kilkis Development Agency Pella Development Agency Imathia Development Agency Pieriki Development Agency Thessaloniki Technology Park (TTP) Centre for Research and Technology - Hellas (CERTH)

Source: Sources: ELSTAT (2019) OECD (2019b).

Ageing in Central Macedonia is an important issue as the share of population over 70 years old is higher compared to Greek or EU average levels, which becomes even more crucial due to the highest increase of the variable among the Greek regions (6.5%) during the crisis[28]. This is also verified from the elderly dependency ratio which, in 2019, was equal to 35.1%, which is slightly above the national average. The share of population (25-64 years) with tertiary education is 31.1%, which is close to the national and European average. The population of the region lives predominantly in cities, being the urbanization rate (78.3%) close to the national average. Finally, the index of crude rate of net migration for the region of Central Macedonia, though reduced, is positive reflecting an immigration-generated population increase in the area (Table 3.2).

[28] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Table 3.2. Indicators for the population characteristics of the region of Central Macedonia

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	1,875,996	*2*	17[a]		-0.16	*8*
Population share (%) in the country, 2017	17.5	*2*			1.3	*8*
Population density (inh/km^2), 2018	98.0	*2*	120	83	-0.16	*8*
(%) Population >70, 2011	14.9	*10*	101	113	6.5	*1*
Youth Dependency Ratio[b], 2019	22.3	*6*	99		-0.2	*9*
Elderly Dependency Ratio[b], 2019	35.1	*9*	101		1.9	*4*
(%) Population (25-64 years) with tertiary education, [e]	31.1	*2*	100	99	3.3	*10*
Urbanization ratio, 2011	78.3	*2*	102		0.2	*8*
Crude rate of net migration[d], 2017	1.6	*7*			-1.1[c]	*4*

Note: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011.
Source: Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region includes an important primary sector generating 5.6% of regional GDP and 12.0% of regional employment. The share of primary sector to GDP is relatively high compared to the national average (about 1.4 times) and significantly higher than the EU average (3.6 times). Although the relative productivity of the primary sector in Central Macedonia is lower when compared to the one of industry and services, the region has a higher figure when compared to the national average or the EU (1.2 times the national average and 1.4 times than the EU average). (Table 3.3).

The region is endowed also with a significant secondary sector with a share in GDP (18.9%) and relative productivity (1.4) above the national average. Main industrial activity includes medium to low technology and labour-intensive sectors.

The tertiary is the largest sector in the region, even though its GDP share and relative productivity are slightly lower than the national average (Table 3.3).

Table 3.3. Structural indicators of production in the region of Central Macedonia

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100	EU=100	Annual change (%)	National Rank
			(national share)			
(%) Primary in GDP, 2016	5.6	9	137	361	2	9
(%) Secondary in GDP, 2016	18.9	6	111	76	-1	8
(%) Tertiary in GDP, 2016	75.5	6	96	102	0.1	2
(%) Primary in Employment, 2015	12	11	112	252	0.5	3
(%) Secondary in Employment, 2015	13.1	6	100	60	-6.1	13
(%) Tertiary in Employment, 2015	74.9	5	98	102	1.4	3
(%GDP)/(% Employment) Primary, 2016	0.5	6	122	143	1.8	11
(%GDP)/(% Employment) Secondary, 2016	1.4	5	111	126	6.2	3
(%GDP/(% Employment) Tertiary, 2016	1	10	97	100	-1.5	6

Sources: OECD (2019a), ELSTAT (2019)

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures specialization in production, shows that Central Macedonia has developed a strong specialization (with LQ>1.25) in manufacturing, and a lower but still detectable specialization in nearly all branches of tertiary sector. The latter mostly refers to information and communication, professional, scientific and technical activities, financial and insurance activities, administrative and support services, and other services (Table 3.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in agricultural, labour-intensive and specialized supply sectors (Table 3.4).

Central Macedonia shows a highly diversified production base, as it has developed some level of specialization in 19 (out of 38) NACE2 branches. Strong or high specialization in textile and leather, weak to modest specialization in motor vehicles, furniture, non-metallic minerals, machinery (electrical and non), food/beverages/tobacco, real estates, water works and supply, petroleum products, trade, paper, education, health, agriculture, electronic equipment repair of machines, and in management consulting activities. The region displays overall specialization in 12 tradable branches.

The region could take advantage of its diversity in the production base to develop value chains through local forwards and backwards linkages, especially in the branches of higher specialization. By contrast, these linkages are not always present or strong and the region's prospects for growth are hindered by moderate regional multipliers.[29] Only seven branches appear to have regional multipliers greater than one, two of them are in tradable branches and four in branches of regional specialization. This implies that in several branches, an increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

[29] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Table 3.4. Sectoral specialisation in the region of Central Macedonia

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	0.87	*9*		
LQ in mining, energy, electricity, water supply, 2016	0.3	*12*		
LQ in manufacturing, 2016	1.35	*4*		
LQ in construction, 2016	0.78	*11*		
LQ in distr. trade, transport, accom., food serv., 2016	0.91	*6*		
LQ in information and communication, 2016	1.18	*3*		
LQ in financial and insurance activities, 2016	1.15	*2*		
LQ in professional, scientific and technical act., 2016	1.18	*2*		
LQ in administrative and support services, 2016	1.1	*6*		
LQ in other services, 2016	1.16	*4*		
RCA[b] in agricultural sector, 2012	1.9	*7*	3.6	*4*
RCA in resource-intensive sector, 2012	0.6	*7*	5.7	*3*
RCA in labour-intensive sector, 2012	1.8	*4*	-0.6	*10*
RCA in scale-intensive sector, 2012	0.9	*6*	2.1	*6*
RCA in specialized supplier sector, 2012	1.4	*2*	8.1	*3*
RCA in science-based sector, 2012	0.9	*3*	-0.2	*7*
Diversification of productive base[c], 2011	19 (1/*12*)	*2*		
Sectors with regional multiplier effects >1[d], 2011	7(4/2)	*2*		

Note: Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Source: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performances and current trends

Central Macedonia is generating 14% of the National GDP ranking as the second largest regional economy in Greece, after the metropolitan region of Attica. However, its development level, in GDP per capita terms, is relatively low compared to the national average (79%) and very low compared to the EU average (52%). Both GDP and GDP per capita have declined during the last decade by 3.6% and 3.4% respectively, implying a remarkable drop in welfare levels. The productivity level in Central Macedonia is lower compared to the national (84%) and significantly lower compared to EU figure (56%), holding the 6th position among the Greek regions. It has declined in the post-2008 period by -1.3%, which is however a modest drop if compared to the other regions.

The region is the second most export-oriented economy in Greece, as its regional merchandise exported are equal to 17.4% of GDP, albeit the increase of the index during the crisis period (by 4.2% annually) was modest, placing the region in the 11th place. The share of exports in GDP is satisfactory comparing to national average (123%), but low (53%) when compared to the EU average. Central Macedonia appears to have a relatively good performance in the European Regional Innovation Scoreboard, ranking second

among Greek regions, but its index is equal to just 66% of the EU average. Its performance has slightly increased during the last decade by just 0.1% (Table 3.5).

The region is experiencing one of the highest unemployment rates (21%), ranking in the 4th place higher than the national average, but also far higher than the EU average. Unemployment on average has increased by 9.3% during the last decade, correspondingly the employment ratio has declined by 1.5%.

Table 3.5. Indicators of development, competitiveness and welfare for the region of Central Macedonia

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	OECD=100	Annual change (%)	*National Rank*
GDP, 2016 (constant 2010 prices, ml. €)	25,684	*2*	14[a]			-3.6	*9*
GDP per capita, 2016 (€/inh.)	13,649	*8*	79	52	50	-3.4	*7*
GDP share (%) in the country, 2017	13.8	*2*				0.6	*7*
Employment share (%) in the country, 2017	16.8	*2*				0.2	*8*
(%) Employment/Population, 2018	40.1	*10*	96	94		-1.5	*9*
(%) Unemployment, 2018	21.0	*4*	107	300	14[d]	9.3	*4*
Productivity (GVA/worker, thousand €), 2017	32.5	*7*	84	56[c]		-1.3	*6*
Merchandise exports to GDP ratio, 2016	17.4	*2*	123	53		4.2	*11*
Regional Innovation Scoreboard, 2017	67.3	*3*		66		0.1[b]	*9*

Note:: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)!Add the note here.
Source: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).<!!Add the source here.

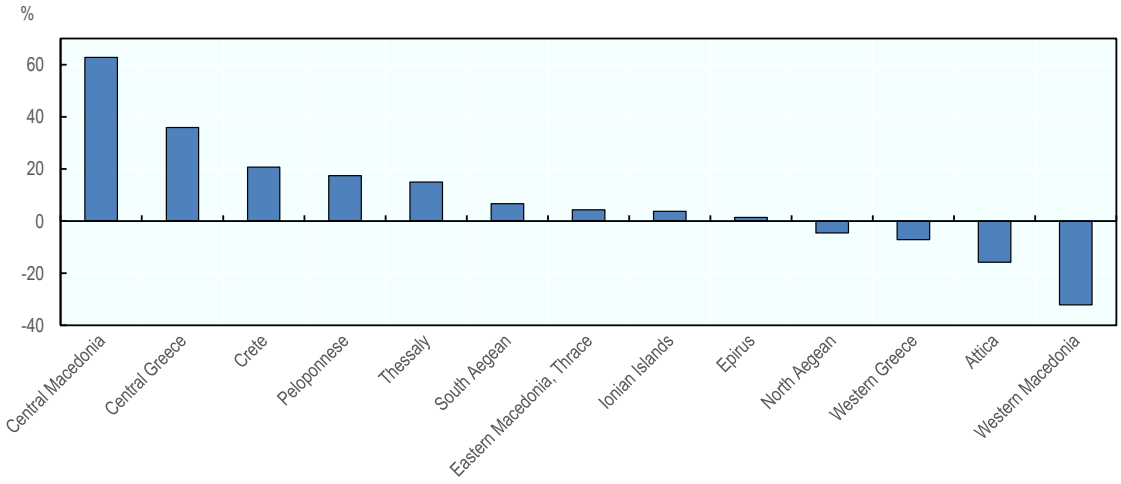
According to the OECD analysis and the Social Scoreboard indicators published by Eurostat (2019b), Central Macedonia is facing serious social problems related to the condition of its human resources (Table 3.6). The figures show that almost 68% of jobless people are long-term unemployed and the share of population in risk of poverty and social exclusion is 30%. These values are slightly lower than the national average. However, the figures show that almost 10% of the population of Central Macedonia does not have access to health services, and 16% of the young people in the age group 15-24 are out the education or the labour market. These two figures are higher than the national average (Table 3.6). Between 2015 and 2017, Central Macedonia has contributed to the growth of national GDP by about 63% (Figure 3.3).

Table 3.6. Social indicators for the region of Central Macedonia, 2018

Social indicator (year)	Greece	Central Macedonia
Share of population with lack of access to health services	8.8	9.6
Long-term unemployment	70.3	67.5
Youth aged 15-24 excluded from education or the labour market	14.1	16.1
Share of people in danger of poverty or social exclusion	31.8	30.4

Source: Eurostat (2019b).

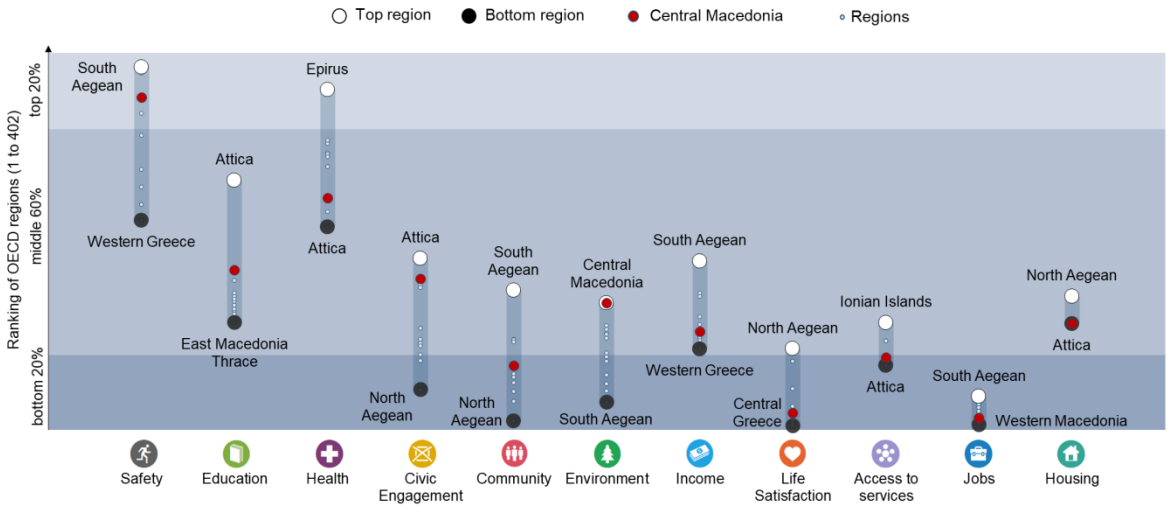
Figure 3.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Central Macedonia is varying in a number of well-being indicators estimated by OECD (2019c, figure 3.4 and table 3.7). Compared to 402 OECD regions, Central Macedonia belongs to the middle 60% group in the fields of safety, education, health, civic engagement, environment, income, and housing. Compared to the other OECD regions, Central Macedonia is having a relatively high score in safety and health and very low scores in terms of education, civic engagement, income, and jobs. When compared to the other Greek regions, Central Macedonia is above the national average in civic engagement, safety, and environment, close to the national average in education, health, community, income, and housing, below the national average in life satisfaction, access to services, and jobs.

Figure 3.4. Regional well-being indicators for Central Macedonia



Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Table 3.7. Individual well-being indicators outcomes in Central Macedonia and Greece

	Country Average	OECD median region	Central Macedonia
Safety			
Homicide Rate (per 100 000 people), 2016	0.8	1.3	0.4
Education			
Labour force with at least upper secondary education (%), 2017	76.7	81.7	76.2
Health			
Life Expectancy at birth (years), 2016	81.5	80.4	81.3
Age adjusted mortality rate (per 1 000 people), 2016	7.5	8.1	7.5
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63.6	70.9	66.8
Community			
Perceived social network support (%), 2013	81.1	91.4	82.0
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18.4	12.4	15.3
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	12 069
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5.6	6.8	5.2
Access to services			
Households with broadband access (%), 2017	65.0	78.0	62.0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53.7	67.7	51.8
Unemployment rate 15 to 64 years old (%), 2017	21.8	5.5	23.2
Housing			
Rooms per person, 2016	1.5	1.8	1.5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

According to the national Special Framework for Spatial Planning and Sustainable Development of Aquaculture, in Central Macedonia there are three PAY areas[30] (classified of category A and B): two are in Thermaikos Bay, one in the metropolitan area of Thessaloniki (in Imathia's sub-region) and another one in Pieria's sub-region.

While mussel and shell farming dominate in the areas of Pieria and Thessaloniki, fishery is an important sector in the sub-regions of Thessaloniki and Chalkidiki, According to the 2019 annual report on "Greek Aquaculture'" issued by the Greek Mari-cultures Federation, 67% of Greece's shell cultivation is hosted in Central Macedonia (Thessaloniki 26%, Pieria 25%, Imathia 16%, Kavala 8% and Pthiotida 6%).

Central Macedonia harbours 11% of the total Greece's fishing fleet, counting for 18% of fishing capacity.[31] Seventeenth (17) ports are located in Central Macedonia (8% of the total number of ports in Greece). The port of Thessaloniki is the second biggest port in Greece (after Piraeus in Attica) and it is the sole port in the region that may host cruise ships.

Coastal tourism in Central Macedonia has highly developed over the last years, especially in the areas of Chalkidiki and Pieria. There are four distinct developed holiday coastal zones: Kassandra, Sithonia, Strymonikos bay, and South Pieria. Hotel capacity is bigger in Chalkidiki, (510 hotels), followed by Pieria (375 hotels) and Thessaloniki (145 hotels) in 2019. All the areas of Chalkidiki, especially Kassandra, face an enormous seasonal pressure for the high demand that leads to overpopulation during the summer months.

Enabling Factors

Transport, health digital infrastructure and environment

The region of Central Macedonia is advantaged by geography, as it is a gateway for trade between Greece and South-Eastern Europe. However, its transport infrastructure, as the relevant indicators show, is below the national average and (in some cases) among the last places among the regions. In terms of road density and freight transport, Central Macedonia is behind the metropolitan region of Attica, some islands and regions with a nodal geographic position in trans-European networks.

[30] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

[31] European Parliament (2006), Directorate-General for Home Affairs of the Union, note on "Fishery in Greece".

In terms of air and port transport, Central Macedonia has a port and an airport that are part of the core networks in Europe. During the crisis period, the region featured the second highest increase in the country in the number of passengers in the maritime transport and a modest increase in the number of passengers in the air transport.

In terms of health infrastructure, the region holds the third position in the country with respect to the number of hospital beds per inhabitant, but during the crisis it experienced an important drop of this indicator (2.8%). Finally, air pollution in Central Macedonia is in modest levels compared to the other regions (7th place) with a relatively small descending rate in the country (Table 3.8).

Table 3.8. Indicators of infrastructure for the region of Central Macedonia

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	29.1	*8*	95		
Commercial airports	1(**1**)c	*10*	3		
Passengers in air transport/1000 inh, 2016	3.0	*6*	73	3.6	*7*
Commercial ports	1(**1**)c	*12*	1		
Passengers in maritime transport/1000 inh, 2016	0.1	*12*	5	2.3	*2*
Road freight transport (thousand tons/inh), 2017	22.8	*9*	49	-0.9	*10*
Hospital beds/10,000inh., 2015	44.7	*3*	106	-2.8	*9*
Air Pollution in PM2.5 (μg/m³), 2017	15.4	*7*		-2.0	*4*

Note: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Source: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013).

Innovation, human capital and skills

R&D expenditure is an indicator of the capacity of the regional science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In Central Macedonia, the figures show that R&D-related expenditure is fairly good but still lower, compared to the national average (Table 3.9).

The Tertiary Education sector (Aristotle University of Thessaloniki, University of Macedonia, International Hellenic University) has a modest per capita performance as the region holds the seventh position in the country, while the relevant expenditure presented one of the highest drops in the country (by 2%) during the crisis period. On the other hand, the private sector appears with a remarkable figure (2nd place at the national level), largely reflecting the capacity of the industrial base of the region.

In terms of patent applications per million inhabitants, Central Macedonia holds the third position in the country, which, however, is well below the national average indicating a significant gap with the first runner (Attica). Moreover, the index declined during the crisis period (2008-15), hence resulting in a modest performance (the 6th highest in the country).

Table 3.9. Indicators of innovation and development policies for the region of Central Macedonia

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	133.1	*5*	82	4.2[b]	*8*
R&D Expenditure in firms (€/inh), 2016	57.4	*2*	84	9.4[b]	*9*
R&D Expenditure in public sector (€/inh), 2016	33.4	*4*	83	8.4[b]	*9*
R&D Expenditure, tertiary education (€/inh), 2016	41.2	*7*	80	-2.0[b]	*10*
Patent applications per million inhabitants, 2015	5.3	*3*	56	-4.8	*6*
Public Investment (€), 2017	880,930,335	*1*	29[a]	2.6	*1*
Public Investment per head (€/inh), 2017	468.5	*2*	168	2.5	*1*
% ESPA allocated in the region	20.2	*2*			
% National Rural Development Program allocated to the region	18.1	*1*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Source: Sources: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020)

Public Investments and European Structural Funds in Central Macedonia

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation provides an indication of the commitment of the State to regional cohesion and balanced growth. Central Macedonia receives 29% of the Public Investment national budget against a population share of 17.5% and a GDP share of 13.8%. As a result, the per capita figure is high when compared to the national average (Table 3.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics of the region, as Central Macedonia receives 16.9% of the amount of ESPA allocated to Regional Operational Programs in Greece and 20.2% of the total amount of ESPA. Central Macedonia received also 18% of the Rural Development Program (Common Agricultural Policy), a figure that is the highest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 3.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Central Macedonia includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[32] that altogether define the development strategy of the Region. That strategy, after a period of open consultation with regional stakeholders, is decided by the Regional Council of Central Macedonia, then included in the programming documents of the ROP and finally approved by the European Commission. The Vision of the region of Central Macedonia considers 'the promotion of the region as a dynamic development area of international reach with distinct identity, competitive and innovative production base, quality environment, strong social and territorial cohesion.' The Regional Operational Program of Central Macedonia aims to boost economic development and create job opportunities in Central Macedonia. It contributes to achieving the Europe 2020 targets for smart, sustainable and inclusive growth, also in line with the Smart Specialisation Strategy. It should create jobs and help SMEs to become more competitive and innovation-driven. EU funding also contributes to meeting the requirements of the Union's 2020targets, in particular as regards greenhouse gas reduction in and increase energy efficiency.

The strategic Objectives of the ROP are stemming from the 11 Thematic Objectives for the programming period 2014-20. They are tailored to the specific conditions of Central Macedonia, in order to ensure that the ROP is consistent and focused on existing regional development problems. These are:

1. Transforming the regional economy into a new and sustainable production model with competitiveness, export openness, innovative entrepreneurship and smart and friendly use of Information and Communication Technologies (ICT)
2. Protection and sustainable management of the natural and man-made environment and natural resources to ensure the quality of life and resource efficiency
3. Integration - promotion of the transport infrastructures and networks for the promotion of the Region in an international transport hub-utilization of its central position in the macro-regions of Southeast Europe and the Eastern Mediterranean
4. Supporting and strengthening the mobility and upgrading of human resources, addressing unemployment dynamically and ensuring social cohesion.

The Regional Operational Program (ROP) of Central Macedonia is about 900 million euro (Table 3.9), in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than half of these funds address environmental (22.9%) and transport (27.2%) projects or actions, while even a higher share of resources is devoted to human resources development and protection (33.3%). A relatively smaller amount is available for actions in support of entrepreneurship (10.9%) and for research and technology (3.6%) (Table 3.10).

Compared to the allocation of resources of the 13 ROPs in different policy priorities, the ROP of Central Macedonia assigns more resources to transport (164%) and entrepreneurship (110%) and less to human capital and social care (87%), research and technology (77%) and environment (69%).

Progress in the implementation of the ROP is relatively slow in terms of actual expenditures: against more than 100% of the budget of ROP (by beginning of December 2020) already contracted for projects and

[32] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

actions just 52.7% were actually spent. The slowest progress in implementation in terms of expenditure is observed in the entrepreneurship priority (4.5%), and the best in the transport (82.2%) priority (Table 3.10).

Table 3.10. Indicators for the Regional Operational Programs of the region of Central Macedonia

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP total budget. (Public expenditure) (€), 2014-2020	894,840,260	*2*	16.93[a]	102.9	*118 (2)*	52.7	*120 (2)*	
% ROP in research and technology	3.6	*9*	80	52.8	*114 (7)*	28.8	*220 (2)*	
% ROP in entrepreneurship	10.9	*3*	134	117.3	*75 (7)*	4.5	*12 (13)*	
% ROP in human capital and social care	33.3	*7*	89	131.5	*126 (1)*	71.6	*125 (1)*	
% ROP in environment	22.9	*10*	74	48.5	*79 (12)*	20.3	*60 (13)*	
% ROP in transport	27.2	*1*	160	119.7	*151 (2)*	82.2	*187 (1)*	
% ROP in technical support	2.0	*12*	96	31.7	*58 (11)*	16.2	*47 (12)*	

Note: Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020).

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 5.3 billion euros euros in terms of total public expenditure for funding approved projects to date) allocated to Central Macedonia by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[33]. Table 3.11 shows that the SOPs of ESPA directed to Central Macedonia devote a relatively higher share to environment and human capital and social care, and significantly lower resources to entrepreneurship, transport and research and technology. These programs also reserve some resources for the restructuring and modernization of public administration in Central Macedonia (0.9%).

[33] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Table 3.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Central Macedonia

Indicator	Regional indicator							
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*	
ESPA budget total (€), 2014-2020	5,319,506,517.22	2	20.89[a]	71.7	*97 (9)*	41.6	*107 (2)*	
% ESPA in research and technology	6.6	*13*	67	46.3	*93 (9)*	15.1	*75 (12)*	
% ESPA in entrepreneurship	13.7	*13*	52	96.5	*100 (8)*	45.8	*99 (8)*	
% ESPA in human capital and social care	27.8	*4*	116	68.9	*74 (9)*	44.2	*87 (8)*	
% ESPA in environment	42.7	*1*	170	72.7	*151 (1)*	44.1	*164 (1)*	
% ESPA in transport	5.9	*9*	57	42.0	*72 (9)*	28.1	*76 (8)*	
% ESPA in administration	0.9	*11*	56	74.3	*103 (3)*	37.7	*111 (5)*	
% ESPA in technical support	2.5	*5*	96	86.2	*96 (13)*	48.3	*91 (13)*	

Note: a: the value is the national share of the region.
Source: Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is depicted by the combined allocation of funds in both the ROP of Central Macedonia and the SOPs. Table 3.12 shows that significant resources are available in the ROP for human capital and social inclusion (298 million euros). Most of these funds are addressing social inclusion actions (249.3 million euros), a smaller share is for education and lifelong learning (37.6 million euros) and actions supporting employment (11.5 million euros). However, as it is shown in Table 3.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and by the severity of

problems faced by vulnerable social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 83.8% and payments 45.7% of the budget.

Moving to R&D, Central Macedonia is characterized by a modest performance as highlighted in the introductory paragraph. Its R&D expenditure per capita is just 82% of the national average, while its expenditure by firms per capita is 84% of the national average (Table 3.9). The ROP of Central Macedonia allocates a consistent amount to R&D and innovation actions (32 million euros), with an low actual expenditure that reached just 33.6% of the budget in early December 2020.

The ROP budget also reserves 97.6 million euros to Smart Specialization, an amount that supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. The whole budget of this action has been already contracted, but a small share has been implemented (3.9%). In addition to the funds allocated in the ROP, in these fields Central Macedonia receives a significantly larger amount from the Sectoral Programs.

Table 3.12. The funds of the ROP of Central Macedonia for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	298,393,429.00	489,767,663	392,251,678	80.1	213,544,476	43.6
Employment	11,477,138.00	6,853,825	4,860,358	70.9	3,787,220	55.3
Education and Lifelong Learning	37,564,604.00	59,963,546	33,014,316	55.1	16,584,365	27.7
Social Inclusion	249,351,687.00	422,950,293	354,377,003	83.8	193,172,890.00	45.7
Innovation	32,133,765.00	27,548,822	16,961,732	61.6	9,250,200	33.6
Research Technology Innovation	21,558,442.00	13,269,856	9,740,306	73.4	6,942,883	52.3
Information and Communication Technologies	10,575,323.00	14,278,966	7,221,426	50.6	2,307,317	16.2
Smart Specialization	97,624,674.00	114,513,098	114,513,098	100.0	4,441,632	3.9
SME's Competitiveness	97,624,674.00	114,513,098	114,513,098	100.0	4,441,632	3.9

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

Table 3.13 shows that Central Macedonia receives from the respective SOPs additional 1.47 billion euros for human capital and social inclusion, 726.7 million euros for Smart Specialization and 351.7 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the latter is being implemented at the regional and local level in a more place-based approach. The advancement of the sectoral skills programs is relatively satisfactory, as 68.9% of the allocated budget has been contracted and 44.2% spent.

In addition, the analysis of the programming and implementation figures show that the SOPs devote significant funds on innovation and ICT that have a relatively good level of contracting (46.2%), but a low degree of spending (15.1%).

The gap between contracting and spending results from a number of factors. Most common factors are (i) the late start of the programs (most of them launched in 2017), (ii) cumbersome administrative procedures, (iii) but also the actual time that an R&D or innovation project needs in order to be completed. The total amount of funding indicates that innovation policies are mainly supported by the SOPs where the budget

is much higher. However, it is worth to consider that the main part of the budget in these programs is directed to ICT infrastructure.

Finally, the funds allocated to Smart Specialization are business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is contracted by 96.5%, but again payments and absorption are still low. One of the reasons for the slow implementation of the investment projects is the weak banking sector. Most investors face difficulties to get a loan or a guarantee from their banks, therefore they have to complete their investment with their own financial means.

The experience from the design and implementation of Structural Funds with respect to skills, innovation and Smart Specialization indicates that there are some issues to address regarding policy design and implementation. First, the sub-program for Research and Technology in the ROP not being activated in time, possibly indicates serious bottlenecks associated to the management and decision-making process. Although the majority of the stakeholders considers the design of the RIS3 quite satisfactory but complains it is not implemented in time and according to the plan.

The second issue is related to the level of funding in the ROP. The most important development opportunities in the region are the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, as well the development of clusters and value chains of local export oriented firms. To seize these opportunities, investments in R&D and innovation policies are required and a significant part of these policies has to be place-based. According to the findings of the OECD analysis, the structural funds would have a greater impact on the regional economy if more emphasis were placed on cooperation between the region's productive and scientific base on innovative actions promoting smart specialization.

Table 3.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Central Macedonia

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		1,477,877,332	1,018,674,946	68.9	653,516,075	44.2
Employment		716,552,367	543,805,709	75.9	383,265,023	53.5
Education and Lifelong Learning		690,927,987	405,564,095	58.7	205,569,872	29.8
Social Inclusion		70,396,979	69,305,142	98.4	64,681,180.00	91.9
Innovation		351,710,746	162,960,511	46.3	52,935,890	15.1
Research Technology Innovation		190,867,283	89,696,276	47.0	27,024,284	14.2
Information and Communication Technologies		160,843,463	73,264,235	45.6	25,911,606	16.1
Smart Specialization		726,709,085	701,549,484	96.5	332,773,186	45.8
SME's Competitiveness		726,709,085	701,549,484	96.5	332,773,186	45.8

Note: *There is no predefined commitment for each region.
Source: Ministry of Development and Investments (2020) data accessed on 5/3/2020.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Central Macedonia is the 2nd largest regional economy in Greece characterized by a relatively low level of development compared to the national and the EU average and by a high rate of unemployment. The economy of Central Macedonia includes an important primary sector,

a strong secondary sector, and a large tertiary sector. The primary sector bases on the agriculture and livestock with low levels of relative productivity. The secondary sector, based on labour-intensive industries (such as, food and furniture), exhibits satisfactory levels of relative productivity. The tertiary sector relies on information and communication technologies, on professional, scientific and technical activities, on financial and insurance activities, and on administrative and support services, and exhibits modest levels of relative productivity. Central Macedonia has, apparently, the opportunity to further stimulate the exporting orientation of its economy. This study identifies opportunities in three main areas for Central Macedonia to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy.
2. Pursuing an innovation-oriented and knowledge-intensive regional society.
3. Enhancing the performance and impact of EU Structural Funds.

Strengthening and diversifying the productive base of the regional economy

Central Macedonia tertiary sector, as seen in the previous section has a highly diversified economic base. However, it lags behind in innovative activities, can significantly improve its local value chains, and is characterized by moderate export and moderate regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Support existing industry sectors in which the region already has a comparative advantage and skilled labour to modernize production technology, improve its products and pursue new export markets.
2. Transform and diversify the primary sector towards quality and organic products and develop a new agro-food sector that exports to specialized and expensive markets.
3. Develop new forms of tourism (gastronomy, agro-tourism, health, cruise, winter, experiences etc.), extent of tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.
4. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region.
5. Develop value chains with strong input-output relationships in branches of comparative advantage with the aim of retaining locally most of the added value of the exportable products and services.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Central Macedonia faces significant challenges in terms of improving the innovative capacity of its productive sector. Despite the fact that the performance of Central Macedonia in terms of innovation indicators improved during the last decade, the region has, still, significant room for betterment. The current ROP of Central Macedonia allocates a satisfying amount of funds for R&D and innovation actions (approximately 32 million euros), whose implementation, however, is experiencing a significant delay.

The fact that the Aristotle University of Thessaloniki appears in the Times Higher Education (Times Higher Education, 2019) global ranking in the 601-800 ranking category indicates that there are, still, unexploited possibilities for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovative activities. This is a necessary requirement for catching up, as the productive system of Central Macedonia is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions together (EC, 2019).

Central Macedonia needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number

of business that cooperate with the Universities in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This major improvement already resulted in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

1. Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Central Macedonia needs to build further on the existing experience of the administration, the Universities, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
2. Address the issue of 'ownership' of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Central Macedonia needs to better tune the regional Smart Specialization Strategy, to make projects and actions more relevant to the real needs and opportunities of the region.
3. Enhance the business-science base collaboration in Central Macedonia, making a better use of the available funds for industrial research and innovation. This can be built on the experience of regional actors (especially Universities and businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives substantial financial support from Structural Funds, which potential is not fully exploited because of the delayed progress in the implementation of the Regional Development Program (ROP) and the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOP projects retain a complementary relation with the corresponding ROP projects, in the sense that they do not cover the same type of actions, in Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency) and in Thematic Objective 7 (promoting sustainable transport and removing bottlenecks in key network infrastructures). In contrast, the centrally-implemented SOPs' projects tends to compete with the ROP projects in Thematic Objective 3 (enhancing the competitiveness of SMEs), either because of overlapping timing in the calls or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in Central Macedonia, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit in full the sub-program for Research and Technology in the ROP that are not fully activated yet. Regional stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
2. Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region,

while horizontal projects or actions or inter-regional programs could be better executed through centrally-run SOPs.

4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional spatial plan.

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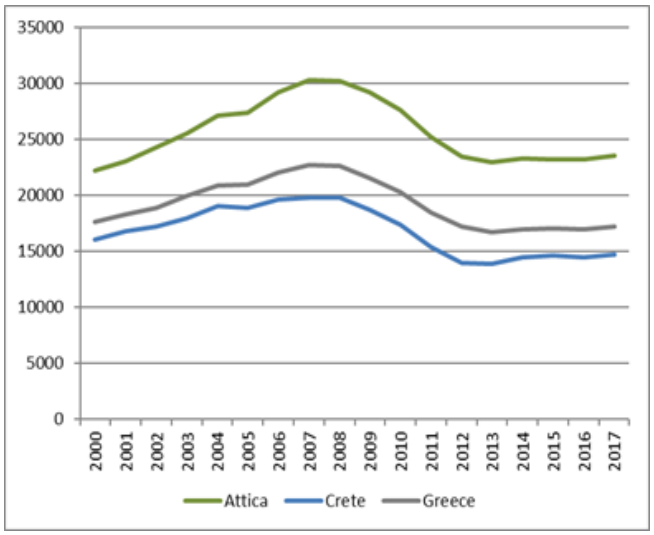
4 Crete

Figure 4.1. Location of the region of Crete

Figure 4.2. GDP per capita in Crete (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020.

Local Government, Geography and Demography

The region of Crete is located in the southern part of Greece and is a completely insular region. Nearby regions are South Aegean and Peloponnese. The city of Heraklion is the capital of the Regional Administration of Crete and the centre of the respective regional unit. Heraklion is also most populated city in the Region. The region belongs to the Decentralized Administration of Crete. Other major cities of the region of Crete are Chania, Rethymno, Agios Nikolaos, which are the centres of Chania, Rethymno and Lasithi regional units respectively. There are several settlements in Crete namely Gazi, Nea Alikarnasos, Ierapetra, Limenas Hersonisou, Sitia, Mournies, Malia, Daratsos, Moires, Kounoupidiana, Souda, Nerokouros, Kato Gouvai, Tympaki, Agia Marina that have a significant population concentration some of which are included in the two Functional Urban Areas of Crete. Moreover, the region is divided into 24 municipalities. (Table 4.1).

Crete is the fifth most populated region in Greece with 633,506 inhabitants in 2018, and the fifth most urbanized. Heraklion is a major port city and a significant airport hub in the regional level as well as Chania,

which is a relevant development pole the western part of the region. The region has experienced a slight population growth in the post-2008 period and a corresponding increasing trend in its population density, which is a bit lower than the national average and significantly lower than the EU average. The population of the region lives predominantly in cities, as the urbanization rate is 63.1%, a value that is, however, below the national average. The share of population (25-64 years) with tertiary education is 27.9%, which is slightly below the national and European average.

Table 4.1. Information on the administrative structure of the region of Crete

Regional Administration	A Governor and a Regional Council are elected directly in Crete for a 4-year term.
Decentralised administration	Crete belongs to the Decentralized Administration of Crete. The capital of the Decentralized Administration is the city of Heraklion.
Regional units (population)	Chania (171,822), Heraklion (338,052), Lasithi (75,995), Rethymno (97,059)
Municipalities	The Region of Crete has 24 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Heraklion with a population of 140,413 inh. (year 2011).
Other major cities (inhabitants)	Chania (54,636), Rethymno (36,305), Agios Nikolaos (11,458), Gazi (14,466), Nea Alikarnasos (14,065), Ierapetra (12,262), Limenas Hersonisou (10,264), Sitia (9,215), Mournies (7,743), Malia (6,808), Daratsos (6,414), Moires (6,305), Kounoupidiana (6,296), Souda (6,198), Nerokouros (5,536) Kato Gouvai (5,307) Tympaki (5,276), Agia Marina (5,156) (year 2011) Herakleion is a Functional Urban Area (medium sized area) with 220,000 inh, and Chania is a FUA (medium sized area) with 110,000 inh. (year 2015)
Regional institutions in South Aegean	University of Crete Technical University of Crete Hellenic Mediterranean University Regional Association of Crete Municipalities Anaptyxiaki Herakleiou S.A. (Development Agency of Heraklion S.A) AKOMM Psiloritis S.A. (Development Centre of Mountainous Milopotamos and Malevizi - Development Agency S.A) Anapltyxiaki Lasithiou S.A. (Development Agency of Lasithi S.A) Crete Development Agency S.A

Source: ELSTAT (2019) OECD (2019b).

Ageing in Crete is not such an important issue as the share of population over 70 years old is on the average compared to the Greek or EU levels and has fairly increased (1.5%) during the crisis[34]. This is also verified from the elderly dependency ratio which, in 2019, was at the level of 30.2%, which is well below the national average. Finally, the index of crude rate of net migration for the region of Crete, though reduced (by 2.9%), is positive reflecting the immigration-generated population increase in the area.

[34] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Table 4.2. Indicators for the population characteristics of the region of Crete

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	633,506	*5*	6[a]		0.33	*3*
Population share (%) in the country, 2017	5.9	*5*			6.0	*1*
Population density (inh/km^2), 2018	76.0	*4*	93	65	0.33	*3*
(%) Population >70, 2011	13.4	*11*	90	101	1.5	*11*
Youth Dependency Ratio[b], 2019	25.22	*3*	112		-0.01	*6*
Elderly Dependency Ratio[b], 2019	30.15	*12*	87		1.37	*7*
(%) Population (25-64 years) with tertiary education, [e]	27.9	*5*	90	89	3.2	*11*
Urbanization ratio, 2011	63.1	*5*	82		0.6	*4*
Crude rate of net migration[d], 2017	1.5	*8*			-2.9[c]	*9*

Note: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a).e: period 2001-2011.
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region includes an important primary sector displaying a higher GDP share than the national average (about 1.6 times as much as the national average and more than 4.5 times as much as the European average). Besides that, the relative productivity of the primary sector in Crete is higher when compared to the one of industry and services, but also it is higher than the corresponding of the country and of the EU average (115% and 135% respectively). The region has a significant agricultural production, and also a livestock and fishing production and the primary sector supports a well-established agro-food sector with strong connections with local industries and the tourism sector (Table 4.3). The region does not have a noteworthy secondary sector in terms of GDP share (9th in the country) and relative productivity is below the national average. Activity in the secondary sector includes sectors like food, fabricated metal products, machinery and equipment and construction. The development of the secondary sector reflects the ability of Crete to have a local production covering local needs due to the insular character of the Region. As far as the tertiary is concerned, this the largest sector in the region, presenting higher relative productivity than the country and EU. It is based on significant tourism flows as Crete is one of the most famous tourism destinations in the whole Mediterranean.

Table 4.3. Indicators of the regional economy of Crete

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	6.9	*8*	169	444	1.3	*11*
(%) Secondary in GDP, 2016	13.9	*9*	81	56	-0.2	*7*
(%) Tertiary in GDP, 2016	79.2	*5*	100	107	-0.1	*5*
(%) Primary in Employment, 2015	15.7	*8*	146	329	-0.2	*6*
(%) Secondary in Employment, 2015	12.9	*7*	98	59	-3.6	*6*
(%) Tertiary in Employment, 2015	71.4	*6*	94	97	0.9	*12*
(%GDP)/(% Employment) $_{Primary}$, 2016	0.4	*7*	115	135	1.8	*10*
(%GDP)/(% Employment) $_{Secondary}$, 2016	1.1	*10*	83	94	4.1	*8*
(%GDP)/(% Employment) $_{Tertiary}$, 2016	1.1	*4*	107	110	-1.1	*4*

Source: OECD (2019a), ELSTAT (2019)

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Crete has developed a strong specialization (with LQ>1.25) in tourism related sectors (LQ in distr. trade, transport, accommodation, food services, is 1.34), and a slight lower specialization in professional, scientific and technical activities (LQ is 1.13), in agriculture, forestry and fishing (LQ is 1.1) in other services (LQ is 1.08) and in financial and insurance activities (LQ is 1.03). (Table 4.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in the agricultural sector. (Table 4.4).

At a more disaggregated level (NACE2), Crete shows a modestly diversified production base, as it has developed some level of specialization in 9 (out of 38) branches. (Table 4.4). Strong or high specialization is exhibited in Hotel and restaurants and in Real estate activities, while weak to modest specialization in agriculture, food, fabricated metal products, machinery and equipment, construction, retail trade of motor vehicles and renting and security activities. The region displays overall specialization in 4 tradable branches.

The region could take advantage of its modestly diverse production base in order to develop value chains through local forwards and backwards linkages, especially in the branches of specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers.[35] Only five branches appear to have regional multipliers greater than one, only one of them is in tradable branches and only two in branches in which the region exhibits specialization. This implies that in most branches an increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

[35] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Table 4.4. Sectoral specialisation in the region of Crete

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	1.1	*6*		
LQ in mining, energy, electricity, water supply, 2016	0.58	*6*		
LQ in manufacturing, 2016	0.6	*9*		
LQ in construction, 2016	0.88	*9*		
LQ in distr. trade, transport, accom., food serv., 2016	1.34	*3*		
LQ in information and communication, 2016	0.98	*5*		
LQ in financial and insurance activities, 2016	1.03	*4*		
LQ in professional, scientific and technical act., 2016	1.13	*4*		
LQ in administrative and support services, 2016	0.81	*9*		
LQ in other services, 2016	1.08	*6*		
RCA[b] in agricultural sector, 2012	2.3	*5*	-4.1	*11*
RCA in resource-intensive sector, 2012	0.7	*5*	14.5	*2*
RCA in labour-intensive sector, 2012	0.9	*5*	0.8	*8*
RCA in scale-intensive sector, 2012	1.0	*4*	4.3	*4*
RCA in specialized supplier sector, 2012	0.2	*9*	-1.8	*5*
RCA in science-based sector, 2012	0.04	*11*	-10.4	*12*
Diversification of productive base [c], 2011	9 (**0**/*4*)	*10*		
Sectors with regional multiplier effects >1[d], 2011	5(**2**/*1*)	*4*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Source: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performances and current trends

Crete is generating 5% of the National GDP being the 4th largest regional economy in Greece. Its development level, in GDP per capita terms, is relatively low compared to the national average (84%) and very low compared to the EU average (56%). Both GDP and GDP per capita have declined annually by 3.4% and 3.7% respectively during the last decade experiencing huge drops in welfare levels. The region faces a high unemployment rate (13.6%) which is dramatically higher than the EU average (194%), but is the lowest in the country (13th position). Unemployment on average has increased by 7.5% during the last decade, while the employment ratio has declined by 1.1%. The productivity level in Crete is one of the lowest in the country holding the 9th position among the Greek regions and significantly lower compared to EU figure (53.7%). It has declined in the post-2008 period by 1.7%, which is one of the lowest drops among regions. The region shows a very small progress towards a more exporting economy, as regional merchandise exports are equal to 6.1% of GDP and have increased by 8.5% annually, placing Crete in the 11th and 7th place in the respective figures. Despite this slight improvement in their exports as a share of GDP, the figure is still well below the national average (43%) and less than one fifth of the EU average (19%). Crete has a good performance in the European Regional Innovation Scoreboard, ranking in the 2nd place among Greek regions and equal to 70% of the EU average. However, its performance has improved during the last decade by only 0.5% annually, which is rather poor among the Greek regions. (Table 4.5)

Table 4.5. Indicators of development, competitiveness and welfare for the region of Crete

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	EU=100	OECD=100	Annual change (%)	National Rank
GDP, 2016 (constant 2010 prices, ml. €)	9,253	4	5a			-3.4	6
GDP per capita, 2016 (€/inh.)	14,636	6	84	56	54	-3.7	10
GDP share (%) in the country, 2017	5	4				1.9	6
Employment share (%) in the country, 2017	6.24	5				0.87	3
(%) Employment/Population, 2018	47.3	2	113	111		-1.1	5
(%) Unemployment, 2018	13.6	13	69	194	37d	7.5	8
Productivity (GVA/worker, thousand €), 2017	31.5	9	83.3	53.7c		-1.7	8
Merchandise exports to GDP ratio, 2016	6.1	11	43	19		8.5	7
Regional Innovation Scoreboard, 2017	71.4	2		70		0.5b	8

Notes: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

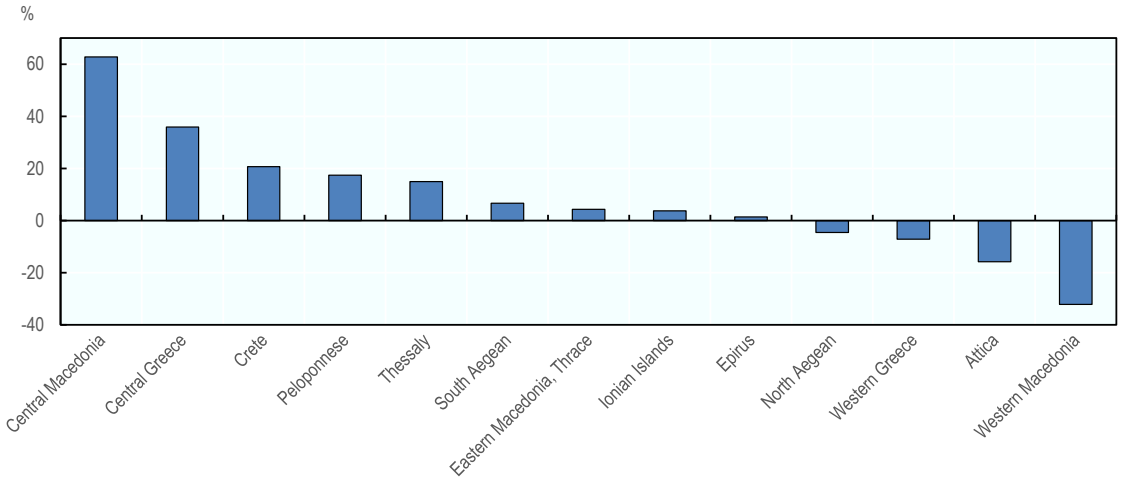
Compared to the national average, Crete is facing modest social problems as almost 7% of the population does not have access to health services, 50% of jobless people are long-term unemployed, and 12% of the young people in the age group 15-24 are excluded from education or the labour market. However, the share of population at risk of poverty and social exclusion is 37% (Table 4.6). Between 2015 and 2017, Crete contributed to the growth of national GDP by about 20% (Figure 4.3).

Table 4.6. Social indicators for the region of Crete (2018)

Social indicator (year)	Greece	Crete
Share of population with lack of access to health services	8.80	6.9
Long-term unemployment	70.3	50.3
Youth aged 15-24 excluded from education or the labour market	14.1	11.7
Share of people at risk of poverty or social exclusion	31.8	37.0

Source: Eurostat (2019b).

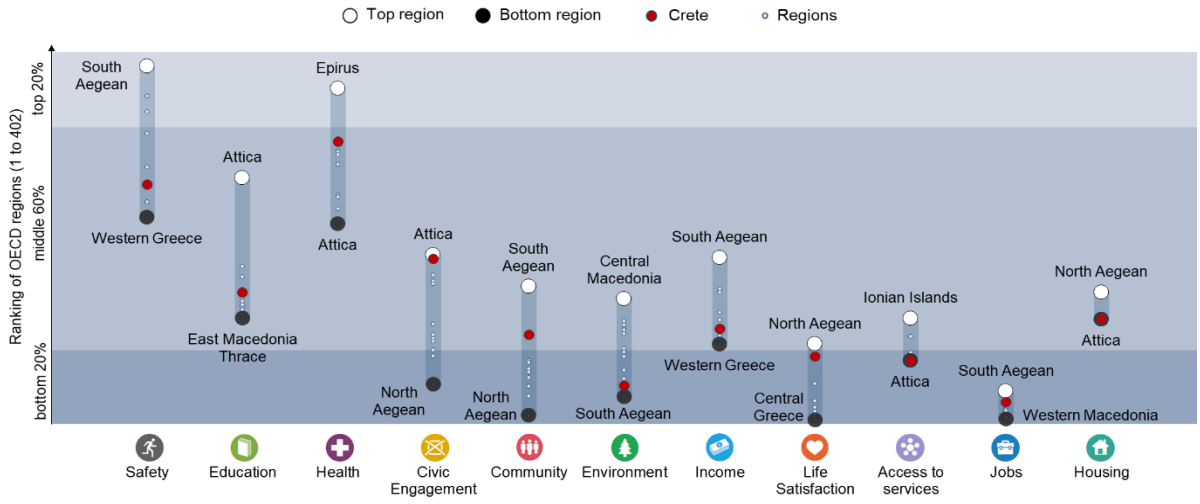
Figure 4.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Crete is varying in a number of well-being indicators estimated by OECD (2019c, Figure 4.4 and Table 4.7). Compared to 402 OECD regions, Crete belongs to the middle 60% group in the fields of safety, education, health, civic engagement, community, income, and housing. Compared to the other OECD regions, Crete has a relatively high score in health and very low scores in terms of environment, access to services and jobs. When compared to the other Greek regions, Crete is above the national average in health, civic engagement, community, life satisfaction and employment, close to the national average in safety and rooms per person, below the national average in education, and towards the bottom end of the scale in terms of all other indicators.

Figure 4.4. Regional well-being indicators for Crete



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 4.7. Individual well-being indicators outcomes in Crete and Greece

	Country Average	OECD median region	Crete
Safety			
Homicide Rate (per 100 000 people), 2016	0,8	1,3	0,9
Education			
Labour force with at least upper secondary education (%), 2017	76,7	81,7	70,5
Health			
Life Expectancy at birth (years), 2016	81,5	80,4	82,2
Age adjusted mortality rate (per 1 000 people), 2016	7,5	8,1	7,1
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63,6	70,9	68,8
Community			
Perceived social network support (%), 2013	81,1	91,4	85,7
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18,4	12,4	22,1
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	,,,
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5,6	6,8	5,9
Access to services			
Households with broadband access (%), 2017	65,0	78,0	59,0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53,7	67,7	56,3
Unemployment rate 15 to 64 years old (%), 2017	21,8	5,5	18,0
Housing			
Rooms per person, 2016	1,5	1,8	1,5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue Economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

The region of Crete does not have significant activities related to aquaculture, with only two sea farms that occupy five hectares of sea area and provide 0.63% to the total capacity of the country. Despite Crete and the near sea is one of the main fishing areas of Greece, the region counts a small fleet of fishing boats, (about 5% of the total fleet of Greece) and it has a relatively limited fishing activity.

On the other hand, Crete's maritime sector is considerably developed, counting 146 ports in 2006 (33% in Chania Prefecture, 31% in Lasithi Prefecture, 26% in Heraklion Prefecture, and 10% in Rethymno Prefecture). Almost half of these ports are anchorage ports, while about 20% are fishing shelters, 10% are shelters of mixed-use, 10% are tourist shelters, 5% are ports for small boats.

Regarding cruise activities, only Heraklion counts six passenger terminals, five of which are also cruise ports. The majority of Crete region's ports faced a positive development between 2015-19, with Heraklion ports facing the highest number of cruisers' arrivals in 2019 (204 arrivals), followed by Souda port (132), and Agios Nikolaos and Rethymno ports (with approximately 35 cruisers arrivals each). To be noticed that Agios Nikolaos faced a 25% loss of cruisers arrivals between 2015 and 2019.

Concerning marine tourism, the region of Crete plays an important role in Greece's overall economy. The Region is planning to develop further, establishing diving parks in the Prefecture of Heraklion and in the marine area of "Mpros Yallos" bay, in Chania Prefecture. Crete also hosts a big Aquarium with thousands of different marine species in 2.600 square meters and the institute of Marine Biological Resources & Inland Water, one of the three institutes of Hellenic Centre of Marine Research, which constitute the largest marine test tank infrastructure in the Mediterranean.

Enabling Factors

Transport, health and digital infrastructure and environment

The region of Crete is not favoured by geography being completely insular. However, its transport infrastructure, as the relevant indicators show, is not below the national average and (in a number of them) is in a quite good position. In terms of road density, Crete is on the national average but in terms of freight, transport is in one of the worst positions, but this shows exactly the importance of maritime and air transport for the island.

In terms of air and maritime transport, the region is one of the most advanced in the country. One of the airports and one of the ports in the region have a core position in the Trans European Transport Network (the other two airports and one out of eleven ports are included in the TEN-T). Worth to note that the economic crisis has affected negatively both maritime and freight transport. Similarly, in terms of health infrastructure, the region holds the seventh position in the country with respect to the number of hospital beds per inhabitant, a position that has worsen over time (Table 4.8).

Finally, air pollution in Crete is the highest compared to the other regions (1st place) but presents one of the highest rates of decline in the country (3rd highest negative value).

Table 4.8. Indicators of infrastructure for the region of Crete

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	30.0	*7*	98		
Commercial airports	3(**1**/2)[c]	*3*	8[a]		
Passengers in air transport/1000 inh, 2016	15.4	*3*	368	3.1	*9*
Commercial ports	11(**1**/*1*)[c]	*5*	9[a]		
Passengers in maritime transport/1000 inh, 2016	3.4	*8*	116	-4.4	*9*
Road freight transport (thousand tons/inh), 2017	15.2	*11*	33	-18.3[b]	*13*
Hospital beds/10,000inh., 2015	37.7	*7*	89.1	-3.0	*10*
Air Pollution in PM2.5 (µg/m³), 2017	25.1	*1*		-2.4	*11*

Note: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Source: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In Crete the figures show that R&D-related expenditure is very high, compared to the national average in all sub-categories (except in firms) and especially in public sector where the region holds the first position, and also in the tertiary education where the region holds the second place due to the strong academic institutions (Table 4.9). Furthermore, the increase in the expenditures during the crisis period is somewhat satisfying (but lower than the national average).

In terms of patent applications per million inhabitants, Crete holds the fourth position in the country which is below the national average (54%) indicating a significant gap with the first runner (Attica). Moreover, the index worsened during the crisis period (2008-15), displaying a 4.6% decrease.

Table 4.9. Indicators of innovation and development policies for the region of Crete

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	199.6	*2*	124	2.8[b]	*10*
R&D Expenditure in firms (€/inh), 2016	16.0	*6*	23	4.9[b]	*11*
R&D Expenditure in public sector (€/inh), 2016	86.5	*1*	214	2.6[b]	*13*
R&D Expenditure, tertiary education (€/inh), 2016	95.1	*2*	185	2.9[b]	*5*
Patent applications per million inhabitants, 2015	5.1	*4*	54	-4.6	*5*
Public Investment (€), 2017	142,528,598	*6*	5[a]	-2.9	*4*
Public Investment per capita (€/inh), 2017	225.3	*9*	81	-3.4	*4*
% ESPA allocated to the region	6.00	*6*			
% National Rural Development Program allocated to the region	9.4	*5*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Source: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020).

Public Investments and European Structural Funds in Crete

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation provides an indication of the commitment of the State to regional cohesion and balanced growth. Crete receives 5% of the Public Investment national

budget against a population share of 6% and a GDP share of 5%. As a result, the per capita figure is slightly lower compared to the national average (Table 4.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is better aligned to the economic characteristics of the region, as Crete receives 7.46% of the amount of ESPA allocated to Regional Operational Programs in Greece and 6% of the total amount of ESPA. Crete has also received 9.4% of the Rural Development Program (Common Agricultural Policy), a figure that is the fifth highest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 4.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Crete includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[36] that altogether define the development trajectory (strategy) of the Region, as defined by the Regional Council in consultation with regional stakeholders, within the general EU and national priorities. The Vision of the Region of Crete is “Dynamic and sustainable Crete”.

The Objectives of the Region of Crete are the:

1. re-orientation of the local economy;
2. exit from the crisis; and
3. direction towards a smart, sustainable, and inclusive growth path.

The Priorities of the Region of Crete are to:

1. re-organize the agro-food complex;
2. accentuate the culture-tourism complex;
3. develop new, future-oriented, activities; and
4. enhance technological activities.

The Regional Operational Program (ROP) of Crete is about 394 million euro, in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than half of these funds address environmental (36.3%) and transport (17.9%) projects or actions, while a significant share of resources is devoted to human resources development and protection (33.3%). A relatively smaller amount is available for actions in support of entrepreneurship (5.8%) and for research and technology (5.1%) (Table 4.10).

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Crete assigns more resources to environment (137%) and research and technology (108%) and less to human capital and social care (91%), entrepreneurship (72%), transport (72%) and human capital and social care (91%).

The progress in the implementation of the ROP has been improving over the last year: whereas about 89.7% of the budget of ROP (by the early December 2020) have been already contracted for projects and

[36] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

actions, 41.7% were actually disbursed. The slowest progress in the implementation process in terms of spending is observed in the research and technology (2.7%) and the transport (26%) priorities, and the best one (63.1%) in the human capital and social care. Despite the weak performance, deviation from the overall performance of the ROPs is limited, with the exception of research and technology and transport sub-programs (Table 4.10).

Table 4.10. Indicators for the Regional Operational Programs of the region of Crete

Indicator	Regional indicator						
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*
ROP total budget. (Public expenditure) (€), 2014-2020	394,196,731	*5*	7.46[a]	89.7	*103 (7)*	41.7	*95 (8)*
% ROP in research and technology	5.1	*5*	113	50.6	*110 (8)*	2.7	*21 (10)*
% ROP in entrepreneurship	5.8	*12*	71	181.2	*116 (4)*	49.0	*131 (4)*
% ROP in human capital and social care	33.3	*9*	89	118.6	*113 (3)*	63.1	*110 (3)*
% ROP in environment	36.3	*5*	117	57.7	*95 (5)*	34.6	*102 (6)*
% ROP in transport	17.9	*6*	105	84.6	*107 (5)*	26.0	*59 (10)*
% ROP in technical support	1.7	*13*	82	64.9	*119 (3)*	30.2	*88 (6)*

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020).

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 1.45 billion euros in terms of total public expenditure for funding approved projects to date) allocated to Crete by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development).[37] Table 4.11 shows that the SOPs of ESPA directed to Crete devote a relatively higher share to entrepreneurship and environment, more or less similar shares to human capital, smaller resources to research and technology, and significantly lower in transport. These programs also reserve some resources for the restructuring and modernization of public administration in Crete (1.1%).

[37] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Table 4.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Crete

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-2020	1,451,733,895.23	*7*	5.70[a]	81.5	*110 (2)*	40.9	*106 (3)*
% ESPA in research and technology	15.1	*1*	152	48.7	*98 (6)*	18.2	*90 (10)*
% ESPA in entrepreneurship	24.5	*8*	93	94.4	*98 (10)*	45.3	*98 (9)*
% ESPA in human capital and social care	28.3	*3*	118	107.1	*115 (3)*	52.1	*103 (6)*
% ESPA in environment	21.3	*10*	85	55.6	*116 (3)*	31.0	*115 (4)*
% ESPA in transport	8.0	*7*	78	81.3	*138 (5)*	55.8	*150 (3)*
% ESPA in administration	1.1	*10*	70	79.9	*111 (2)*	33.4	*98 (10)*
% ESPA in technical support	1.7	*13*	65	90.4	*101 (6)*	52.9	*100 (11)*

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020).

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection results by the combined allocation of funds in both the ROP of Crete and the SOPs. Table 4.12 shows that significant resources are available in the ROP for human capital and social inclusion (131 million euros). Most of these funds are addressing social inclusion actions (100 million euros), a smaller share is for education and lifelong learning (25 million euros) and actions supporting employment (5 million euros). However, as shown in Table 4.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by vulnerable social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social

exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 87.4% and payments 43.7% of the budget.

Moving to R&D, Crete characterizes for a good performance as highlighted in the introductory paragraph. Its R&D expenditure per capita is 124% of the national average, while its expenditure by firms per capita is 23% of the national average. Despite the serious gap, the ROP of Crete allocates a relatively small amount to R&D and innovation actions (20 million euros), which in addition has been poorly activated, since it experiences a serious delay.

The ROP budget also reserves 22.7 million euros to Smart Specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is almost fully contracted, but payments are still low. In addition to the funds allocated in the ROP, in these fields Crete receives a significantly larger amount from the Sectoral Programs.

Table 4.12. The funds of the ROP of Crete for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	131,286,388.00	180,694,183	155,730,530	86.2	82,815,501	45.8
Employment	5,108,520.00	228,000	224,104	98.3	115,576	50.7
Education and Lifelong Learning	25,979,864.00	28,447,979	22,654,984	79.6	16,250,323	57.1
Social Inclusion	100,198,004.00	152,018,204	132,851,442	87.4	66,449,601.87	43.7
Innovation	19,976,513.00	15,495,029	10,099,167	65.2	536,962	3.5
Research Technology Innovation	10,877,094.00	9,673,914	9,673,909	100.0	451,158	4.7
Information and Communication Technologies	9,099,419.00	5,821,115	425,258	7.3	85,804	1.5
Smart Specialization	22,673,254.00	41,582,565	41,082,565	98.8	11,110,097	26.7
SME's Competitiveness	22,673,254.00	41,582,565	41,082,565	98.8	11,110,097	26.7

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

Table 4.13 shows that Crete is estimated to receive from the respective SOPs additional 411 million euros for human capital and social inclusion, 355 million euros for Smart Specialization and 219 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs focuses more on employment and lifelong learning and very little on social protection, as the latter has been implemented at the regional and local level according to a more place-based approach. Implementation of the sectoral skills programs is overall satisfactory, as 107.1% of the allocated budget has been contracted and 52.1% spent. In addition, the analysis of the programming and implementation reveals that the SOPs devote good deal of funds on innovation and ICT that have a low degree of contracting (48.7%) and, correspondingly, an even lower degree of spending (18.2%).

Table 4.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Crete

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		411,483,598	440,559,212	107.1	214,286,716	52.1
Employment		159,021,812	124,968,725	78.6	75,747,869	47.6
Education and Lifelong		223,507,274	286,949,176	128.4	111,807,489	50.0

Learning						
Social Inclusion		28,954,512	28,641,311	98.9	26,731,358.67	92.3
Innovation		219,082,880	106,620,309	48.7	39,868,124	18.2
Research Technology Innovation		77,956,434	40,029,411	51.3	19,515,112	25.0
Information and Communication Technologies		141,126,446	66,590,898	47.2	20,353,013	14.4
Smart Specialization		355,391,738	335,348,873	94.4	161,051,049	45.3
SME's Competitiveness		355,391,738	335,348,873	94.4	161,051,049	45.3

Note: *There is no predefined commitment for each region.
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

The gap between contracting and spending may be explained by a number of factors, which include: (i) the late start of the programs (most of them launched only in 2017); (ii) cumbersome administrative procedures; (iii) the lengthy time that R&D and innovation projects takes to be instructed and implemented; (iv) the weak banking sector, which is reluctant to provides loans or guarantee funds for businesses investment.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Crete is the 4th largest regional economy in Greece characterized by a low level of development compared to the national and the EU average and a high rate of unemployment. The economy of Crete counts on the presence of an important primary sector, a weak secondary sector, and a large tertiary sector. Primary sector is based on the agro-food industry with low levels of relative productivity. Secondary sector is, mainly, based on construction and on labour-intensive industries (such as food), and exhibits satisfactory levels of relative productivity. Tertiary sector relies on traditional-type industries (such as “mass” tourism) and on professional, scientific and technical activities, with satisfactory levels of relative productivity. Crete has, apparently, the opportunity to further strengthen the development of the agro-food industry to the food and the tourism industries. This study identifies opportunities in three main areas for Crete to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society
3. Enhancing the performance and impact of EU Structural funds

Strengthening and diversifying the productive base of the regional economy

Crete specializes in agriculture and in tourism, and it has modestly diversified economic base. Crete lags behind in innovative activities, lacks significant value chains, and is characterized by limited export and low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Develop new forms of tourism (gastronomy, agro-tourism, health, cruise, winter, experiences etc.), extend tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.
2. Transform the region into an academic destination by developing strong Universities, but also University infrastructure and services, to attract students and scientists from other regions and other countries to study, research and work, highlighting Higher Education as an important industry for the region.

3. Protect the environment and cultural, architectural and historical heritage, improving local quality features and services and highlighting quality of life as a strong advantage that is going to attract new residents to the region.
4. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovative and competitive and to attract high-quality human resources to the region.
5. Develop the energy sector through investments in renewable projects, such as solar, wind, hydroelectric and local energy networks, that are going to reduce energy costs in production and make the region a more attractive investment destination.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Crete faces significant challenges in terms of improving the innovative capacity of its productive sector. Despite the fact that the performance of Crete in terms of innovation indicators improved during the last decade, the region has, still, significant room for improvement in many aspects, e.g. the need to be more business-driven. Nevertheless, the current ROP of Crete reserves a relatively small amount of funds for R&D and innovation actions (approximately 19.9 million euros), which implementation, in addition, is experiencing a serious delay.

The fact that the University of Crete appears in the Times Higher Education (Times Higher Education, 2019) global ranking in the 351-400 ranking category reflects that there are, still, unexploited possibilities for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of Crete is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions together (EC, 2019).

Crete needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the Universities in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This major improvement already appeared in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

- Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Crete needs to build further on the existing experience of the Administration, the Universities, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
- Address the issue of ‘ownership’ of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Crete needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
- Enhance the business-academy collaboration in Crete, making a better use of the available funds for industrial research and innovation. This can be caught-up by building on the experience of these actors (especially the University, but also some businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, which potential is not fully exploited because of the average modest progress in the implementation of the Regional Operational Program (ROP) and to some extend also of the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects are complementing the corresponding ROP's projects, in the sense that they do not cover the same type of actions, as regards Thematic Objective 2 (enhancing access to, and use and quality of, ICT), Thematic Objective 4 (supporting the shift towards a low-carbon economy in all sectors), Thematic Objective 5 (promoting climate change adaptation, risk prevention and management), Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), Thematic Objective 8 (promoting sustainable and quality employment and supporting labor mobility) and Thematic Objective 9 (promoting social inclusion, combating poverty and any discrimination). In contrast, the centrally implemented SOPs' projects are rather competing than complementing the ROP'S projects, because either they overlap in timing the calls or they support similar actions. This regards Thematic Objective 1 (strengthening research, technological development and innovation), Thematic Objective 3 (enhancing the competitiveness of SMEs), and Thematic Objective 11 (enhancing institutional capacity of public authorities and stakeholders and efficient public administration through actions to strengthen the institutional capacity and the efficiency of public administrations and public services related to the implementation of the ERDF, and in support of actions under the ESF to strengthen the institutional capacity and the efficiency of public administration).

To enhance the overall performance and impact of the Structural Funds in Crete, policy intervention should support actions to:

- Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit in full the sub-program for Research and Technology in the ROP that are facing a serious delay in implementation. To be noted that some regional stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
- Better focus the ROP financial intervention targeting support on the manufacturing of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agri-tech, and the development of clusters and value chains of local export-oriented firms.
- Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could remain better implemented through centrally run SOPs.
- Ensure a greater impact of the ROP on the regional economy by aligning it with the regional spatial plan.

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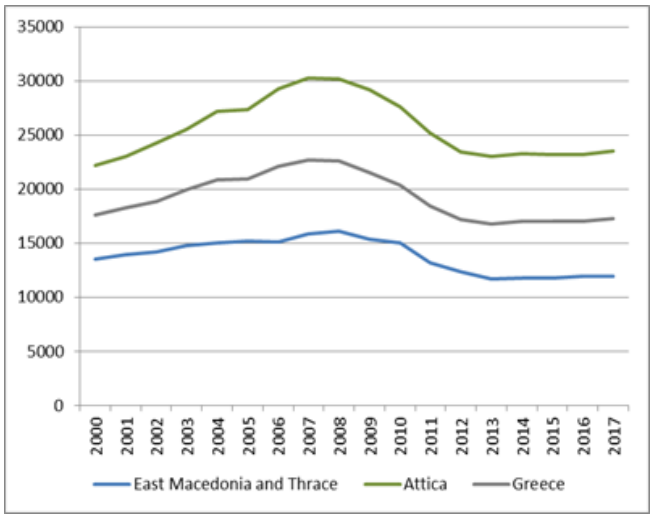
5 East Macedonia and Thrace

Figure 5.1. Location of the region of East Macedonia and Thrace

Figure 5.2. GDP per capita in East Macedonia and Thrace (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

The region of East Macedonia and Thrace is located in the northeast part of Greece and borders with Bulgaria and Turkey. The city of Komotini is the capital of the Regional Administration of East Macedonia and Thrace, however the greater in population city is Alexandroupoli. The region is part of the Decentralized Administration of Macedonia and Thrace. The major cities of the region of EMT are: Drama, Kavala, Xanthi, Komotini and Alexandroupoli, which are the centres of the respective six regional units (also the city of Orestiada has over 10,000 inhabitants). The region includes also a seventh regional unit which is the island of Thasos. Moreover, the region is divided into 22 municipalities covering urban, rural and island areas (Table 5.1).

East Macedonia and Thrace is the sixth most populated region of Greece with 601,175 inhabitants in 2018, and the fourth most urbanized. While Komotini is the administrative centre of the region, the cities of Alexandroupoli, Kavala and Xanthi have larger population size. Moreover, Alexandroupoli is a major port city and a significant commercial hub not only at the regional but also at the national level. The region has

experienced a slight population decline in the post-2008 period and a corresponding decreasing trend in its population density, which is significantly lower than the national and the EU average.

Table 5.1. Information on the administrative structure of the region of East Macedonia and Thrace

Regional Self Government	A Governor and a Regional Council are elected directly in East Macedonia and Thrace for a 4-year term.
Decentralised administration	East Macedonia and Thrace belongs to the Decentralized Administration of Macedonia and Thrace. The capital of the Decentralized Administration is the city of Thessaloniki.
Regional units (population)	Evros (147,947), Kavala (124,917), Rodopi (112,039), Xanthi (111,222), Drama (98,287), Thasos (13,770)
Municipalities	The Region of East Macedonia and Thrace has 22 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Komotini with a population of 50,450 inh. (year 2011).
Other major cities (inhabitants)	Alexandroupoli (57,829), Xanthi (55,681), Kavala (53,778), Drama (44,521), Orestiada (18,136) (year 2011) Xanthi is a Functional Urban Area (small area) with 90,000 inh, and Kavala (small area) with 20,000 inh. (year 2015)
Regional institutions in East Macedonia and Thrace	Democritus University of Thrace Hellenic University Regional Association of East Macedonia and Thrace Municipalities North Evros Research and Development Company SA Dimosinetairistiki Evros S.A. Rodopi Development Agency S.A Kavala Development Agency S.A Drama Development Agency S.A

Source: Sources: ELSTAT (2019) OECD (2019b).

Ageing in East Macedonia and Thrace is an important issue as the share of population over 70 years old is higher compared to the Greek and the EU level and has also increased significantly (3.7%) during the crisis[38]. This is also verified from the elderly dependency ratio which, in 2019, was at the level of 36.7%, which is above the national average. The share of population (25-64 years) with tertiary education is 25%, which is below the national and European average. The population of the region lives predominantly in cities, as the urbanization rate is 65.7%, a value that is, however, below the national average. As regards the index of crude rate of net migration for the region of East Macedonia and Thrace, although it has decreased (by 3.2%), it is positive, reflecting the immigration-generated population increase, although at a declining rate, in the area (Table 5.2).

[38] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Table 5.2. Indicators for the population characteristics of the region of East Macedonia and Thrace

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	601,175	*6*	6[a]		-0.07	*5*
Population share (%) in the country, 2018	5.6	*6*			2.3	*5*
Population density (inh/km^2), 2018	42.5	*9*	52	36	-0.07	*5*
(%) Population >70 years, 2011	16.5	*8*	112	125	3.7	*2*
Youth Dependency Ratio[b], 2019	21.9	*11*	97		-0.8	*12*
Elderly Dependency Ratio[b], 2019	36.7	*7*	106		1.1	*9*
(%) Population (25-64 years) with tertiary education, [e]	25.0	*7*	81	79	3.7[e]	*6*
Urbanization ratio, 2011	65.7	*4*	86		0.8	*2*
Crude rate of net migration[d], 2017	2.4	*5*			-3.2[c]	*11*

Note: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011.
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region includes an important primary sector, displaying a higher GDP share comparing to the national and the European average (about 2 times as much as the national average and more than 5 times as much as the European average). However, the relative productivity of the primary sector in East Macedonia and Thrace is not only lower, when compared to the one of industry and services, but also is the lowest in the country and below the EU average (91%) (Table 5.3).

The region is endowed also with a noteworthy secondary sector in terms of GDP share (4th in the country) and relative productivity above the national average. Industrial activity includes mostly labour-intensive sectors like food, textiles and clothing, mining, paper and tobacco and less high-intensity technology sectors like chemicals, machinery and equipment. The development of the secondary sector and especially manufacturing has been assisted by high investment incentives (mostly grants) provided by State for the region since the 1980s. As far as the tertiary sector is concerned, this the largest sector in the region, presenting the highest relative productivity in the country, based on traditional-type activities (growing tourism activity especially based on tourists from Eastern Europe), and on education, transport and public services. (Table 5.3).

Table 5.3. Structural indicators of production in the region of East Macedonia and Thrace

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	7.9	*6*	193	510	3.6	*7*
(%) Secondary in GDP, 2016	20.3	*4*	119	81	0.1	*6*
(%) Tertiary in GDP, 2016	71.8	*9*	91	97	-0.4	*10*
(%) Primary in Employment, 2015	26.6	*2*	249	559	0.7	*2*
(%) Secondary in Employment, 2015	12.2	*9*	93	56	-5.2	*11*
(%) Tertiary in Employment, 2015	61.1	*11*	80	83	1.1	*7*
(%GDP)/(% Employment) $_{Primary}$, 2016	0.3	*13*	78	91	3.3	*8*
(%GDP)/(% Employment) $_{Secondary}$, 2016	1.7	*4*	128	145	6.4	*2*
(%GDP/(% Employment) $_{Tertiary}$, 2016	1.2	*1*	113	117	-1.6	*8*

Source: OECD (2019a), ELSTAT (2019).

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that East Macedonia and Thrace has developed a strong specialization (with LQ>1.25) in administrative and support services, and a slightly lower in manufacturing (value of LQ is 1.2) (Table 5.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive system of the region leads to an export structure with strong or significant specializations (RCA>1.25) in labour-intensive and agricultural sectors (Table 5.4).

East Macedonia and Thrace shows a modestly diversified production base, as it has developed some level of specialization in 10 (out of 38) NACE2 branches (Table 5.4). Strong or high specialization is exhibited in rubber and plastics, mining and quarrying, and agriculture and fishing, while weak to modest specialization in food, beverages and tobacco, electronic equipment and optical instruments, wood, public administration and defence, chemicals, and water works and supply. The region displays overall specialization in 9 tradable branches.

The region could take advantage of its modestly diverse production base in order to develop value chains through local forwards and backwards linkages, especially in the branches of specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers[39]. Only four branches appear to have regional multipliers greater than one, four of them are in tradable branches and three are in branches in which the region exhibits specialization. This implies that in most branches the increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

[39] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Table 5.4. Sectoral specialisation in the region of East Macedonia and Thrace

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	1.06	*7*		
LQ in mining, energy, electricity, water supply, 2016	0.65	*5*		
LQ in manufacturing, 2016	1.2	*5*		
LQ in construction, 2016	0.91	*8*		
LQ in distr. trade, transport, accom., food serv., 2016	0.79	*9*		
LQ in information and communication, 2016	0.87	*6*		
LQ in financial and insurance activities, 2016	0.93	*6*		
LQ in professional, scientific and technical act., 2016	0.71	*10*		
LQ in administrative and support services, 2016	1.32	*2*		
LQ in other services, 2016	0.81	*11*		
RCA[b] in agricultural sector, 2012	1.4	*8*	-0.6	*10*
RCA in resource-intensive sector, 2012	0.6	*6*	5.3	*4*
RCA in labour-intensive sector, 2012	3.5	*2*	7.4	*4*
RCA in scale-intensive sector, 2012	1.0	*5*	-1.4	*7*
RCA in specialized supplier sector, 2012	0.6	*5*	12.4	*2*
RCA in science-based sector, 2012	0.3	*4*	71.4	*1*
Diversification of productive base [c], 2011	10 (**3**/*9*)	*6*		
Sectors with regional multiplier effects >1[d], 2011	4(**3**/*4*)	*5*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Source: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performances and current trends

East Macedonia and Thrace is generating 4% of the National GDP being the 8th largest regional economy in Greece. Its development level, in GDP per capita terms, is relatively low compared to the national average (70%) and very low compared to the EU average (47%). Both GDP and GDP per capita have declined during the last decade by 3.5%, experiencing one of the highest drops in welfare levels. The productivity level in East Macedonia and Thrace is the lowest in the country holding the last position among the Greek regions and significantly lower compared to EU figure (50%). It has declined in the post-2008 period by 1.9%, which is one of the lowest drops among regions.

The region shows progress towards a more export oriented economy, as regional merchandise exports are equal to 11.1% of GDP and have increased by 5.2% annually, placing East Macedonia and Thrace in the 6th and 10th place in the respective figures. However, despite this progress, the figure is still below the national average (78%) and less than half the EU average (34%). Reference or developing export destinations are the neighbouring Balkan countries, Turkey, but also countries in Eastern Europe and Russia. East Macedonia and Thrace has a low performance in the European Regional Innovation Scoreboard that equals to 52% of the EU average, holding the 10th place among Greek regions. However,

its performance has improved during the last decade by 1%, which is the third better position among the Greek regions (Table 5.5).

The region is experiencing a high unemployment rate (16.3%) which is dramatically higher than the EU average (233%), but one of the lowest in relation to the country (11th position). Unemployment on average has increased by 6.1% during the last decade, while the employment ratio has declined by 0.9%.

Table 5.5. Indicators of development, competitiveness and welfare for the region of East Macedonia and Thrace

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	OECD=100	Annual change (%)	*National Rank*
GDP, 2016 (constant 2010 prices, ml. €)	7,313	*8*	4[a]			-3.5	*8*
GDP per capita, 2016 (€/inh.)	12,115	*13*	70	47	45	-3.5	*9*
GDP share (%) in the country, 2017	3.9	*8*				-1.4	*9*
Employment share (%) in the country, 2017	5.5	*6*				0.7	*4*
(%) Employment/Population, 2018	41.9	*7*	100	99		-0.9	*4*
(%) Unemployment, 2018	16.3	*11*	83	233	28[d]	6.1	*13*
Productivity (GVA/worker, thousand €), 2017	28.8	*13*	75	50[c]		-1.9	*10*
Merchandise exports to GDP ratio, 2016	11.1	*6*	78	34		5.2	*10*
Regional Innovation Scoreboard, 2017	53.4	*10*		52		1.0[b]	*3*

Note: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Source: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

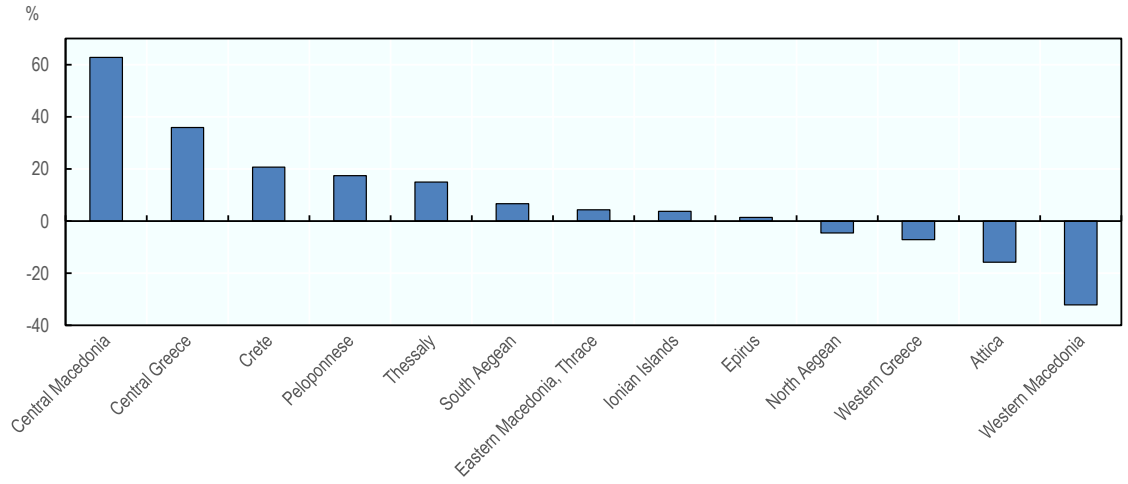
According to the analysis undertaken and the Social Scoreboard indicators published by Eurostat (2019b), East Macedonia and Thrace faces acute social problems related to the condition of its human resources. The figures show that 68% of jobless people are long-term unemployed, a value slightly lower than the national average. Moreover, 10% of the population of East Macedonia and Thrace does not have access to health services, almost 15% of the young people in the age group 15-24 are excluded from education or the labour market, while the share of population in danger of poverty and social exclusion is nearly 34% (Table 5.6). East Macedonia and Thrace contributed to national GDP growth by about 4.5% (Figure 5.3).

Table 5.6. Social indicators for the region of East Macedonia and Thrace, 2018

Social indicator (year)	Greece	East Macedonia and Thrace
Share of population with lack of access to health services	8.8	10.1
Long-term unemployment	70.3	68.0
Youth aged 15-24 excluded from education or the labour market	14.1	14.9
Share of people in danger of poverty or social exclusion	31.8	33.8

Source: Eurostat (2019b)

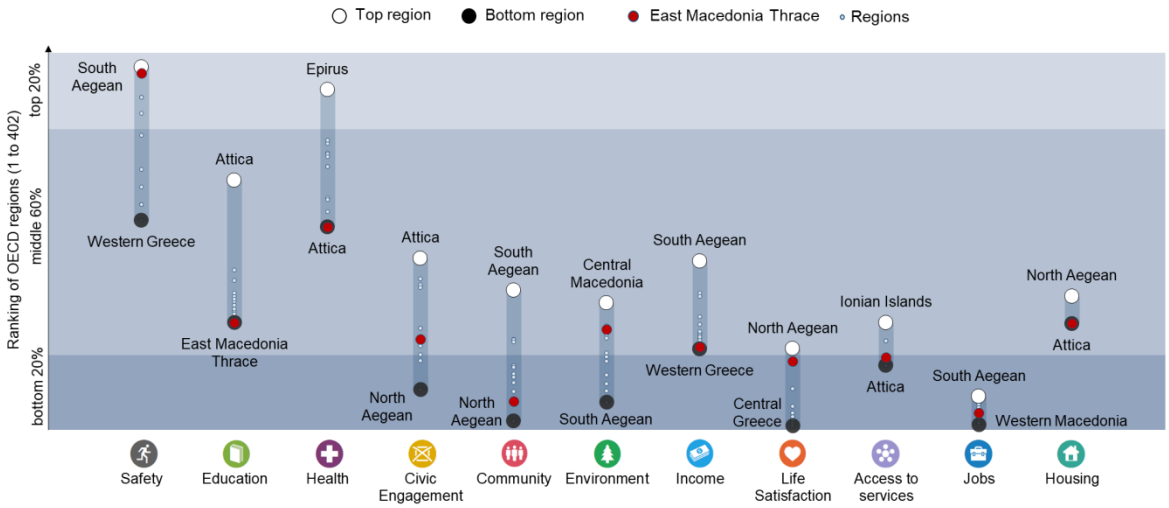
Figure 5.3. Figure 5.1 Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of East Macedonia and Thrace is varying in a number of well-being indicators estimated by OECD (2019c), as shown in Figure 5.4 and Table 5.7). Compared to 402 OECD regions, East Macedonia and Thrace belongs to the middle 60% group in the fields of safety, health, education, civic engagement, environment, income, and housing. Compared to the other OECD regions, East Macedonia and Thrace is having relatively high score in safety and health and very low scores in terms of education, civic engagement, community, income, access to services and jobs. When compared to the other Greek regions, East Macedonia and Thrace is better than the national average in life satisfaction, environment and safety, close to the national average in health, jobs and housing, and below the national average in education, income, civic engagement, community and access to services.

Figure 5.4. Regional well-being indicators for East Macedonia and Thrace



Source: Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 5.7. Individual well-being indicators outcomes in East Macedonia and Thrace and Greece

	Country Average	OECD median region	East Macedonia - Thrace
Safety			
Homicide Rate (per 100 000 people), 2016	0.8	1.3	0.2
Education			
Labour force with at least upper secondary education (%), 2017	76.7	81.7	63.8
Health			
Life Expectancy at birth (years), 2016	81.5	80.4	81.0
Age adjusted mortality rate (per 1 000 people), 2016	7.5	8.1	7.8
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63.6	70.9	57.3
Community			
Perceived social network support (%), 2013	81.1	91.4	74.7
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18.4	12.4	17.5
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	11 050
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5.6	6.8	5.9
Access to services			
Households with broadband access (%), 2017	65.0	78.0	62.0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53.7	67.7	52.9
Unemployment rate 15 to 64 years old (%), 2017	21.8	5.5	19.9
Housing			
Rooms per person, 2016	1.5	1.8	1.5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

Regarding aquaculture, Eastern Macedonia & Thrace have five established PAY[40] zones (Strimonikos Bay, Iraklitsa – Nea Peramos, Agisma – Keramoti – Erasmio , Maronia and Vistonikos Bay), both farming fishes and shellfishes, but no AZAs (Allocated Zones of Aquaculture).

The professional fishing fleet in the Eastern Macedonia & Thrace Region represents about 4% of the fleet nationwide, and mainly counts small, coastal fishing vessels. According to the National Fisheries Data Collection Program (EPSAD, Final Report 2014 - part B), there were 704 professional fishing vessels in the Eastern Macedonia & Thrace in 2014, with a capacity of 6 783 GT (Gross Tonnage).

Eastern Macedonia & Thrace have 2 main ports, Kavala & Keramoti and the port of Alexandroupoli, which have a relevant turnover of both passengers (ferries) and goods. The ports of Kavala and Alexandroupoli can accept also cruise ships, although the cruise ship traffic is minimal: the port of Kavala hosted 5 cruise ships in 2018 and 7 cruise ships in 2019, where the port of Alexandroupoli accepted 2 cruise ships in 2018 and no cruise ships in 2019.

According to the Annual Report by the Greek Tourism Confederation (SETE), in 2019, the revenues from maritime tourism in Eastern Macedonia & Thrace represented 2.4% (€439.8 million) of the total revenues of the country, with the annual number of visitors representing about 10% of the total for Greece.

Enabling Factors

Transport, health digital infrastructure and environment

The region of East Macedonia and Thrace is favoured by geography being located along the crossroads of Europe and Asia. However, its transport infrastructure, as the relevant indicators show, is below the national average and (in a number of them) among the lowest rankings among regions. In terms of road density and freight transport, East Macedonia and Thrace is behind the metropolitan region of Attica and some islands and regions with a nodal geographic position in trans-European networks.

In terms of air and port transport, the region is behind the insular island regions. None of the airports or ports belongs to a core network in the European scale. Worth to note that economic crisis has affected negatively both maritime and freight transport. Similarly, in terms of health infrastructure, the region holds the 6th position in the country with respect to the number of hospital beds per inhabitant. This is the case

[40] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

despite the fact that during the crisis period the region presented the highest corresponding increase (Table 5.8).

Finally, air pollution in East Macedonia and Thrace is significant compared to the other regions (5th place). Additionally, the region presents one of the smallest rates of decline in the country (2 lower negative value).

Table 5.8. Indicators of infrastructure for the region of East Macedonia and Thrace

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	Annual change (%)	National Rank
Road network per km2 (km/100 km2), 2018	22.9	12	75		
Commercial airports	2(2)c	5	5a		
Passengers in air transport/1000 inh, 2016	0.7	8	17	-4.7	13
Commercial ports	6(1)c	8	5a		
Passengers in maritime transport/1000 inh, 2016	3.4	7	116	1	3
Road freight transport (thousand tons/inh), 2017	23.7	8	51	4.1b	5
Hospital beds/10,000inh., 2015	40.3	6	95.2	0.7	1
Air Pollution in PM2.5 (μg/m³), 2017	16.5	5		-1.8	2

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In East Macedonia and Thrace case, the figures show that R&D-related expenditure is very low, compared to the national average in all the sub-categories (Table 5.9). This concerns especially the public sector, where the region holds the last position. However, the increase in the expenditures during the crisis period (apart from the public sector) is satisfying.

On the other hand, the Higher Education sector (Democritus University of Thrace and International Hellenic University) has a higher expenditure figure even though slightly below the national average.

In terms of patent applications per million inhabitants, East Macedonia and Thrace holds the 8th position in the country, which is very below the national average, indicating a significant gap with the front runner (Attica). However, the index improved during the crisis period (2008-15), displaying the highest increase in the country.

Table 5.9. Indicators of innovation and development policies for the region of East Macedonia and Thrace

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	76.6	*7*	47	5.3 [b]	*5*
R&D Expenditure in firms (€/inh), 2016	18.9	*5*	28	21.0[b]	*4*
R&D Expenditure in public sector (€/inh), 2016	9.6	*13*	24	6.1[b]	*11*
R&D Expenditure, tertiary education (€/inh), 2016	47.9	*6*	93	2.6 [b]	*6*
Patent applications per million inhabitants, 2015	2.3	*8*	24	3.6	*1*
Public Investment (€), 2017	82,536,660	*9*	3[a]	-9.1	*13*
Public Investment per head (€/inh), 2017	136.9	*13*	49	-9.3	*13*
% ESPA allocated in the region	6.7	*5*			
% National Rural Development Program allocated to the region	10.0	*3*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Source: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020).

Public Investments and European Structural Funds in East Macedonia and Thrace

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship, and the development of human resources. At the same time, its regional allocation is an indication of the commitment of the State to regional cohesion and balanced growth. East Macedonia and Thrace receives 3% of the Public Investment national budget against a population share of 5.6% and a GDP share of 3.9%. As a result, the per capita figure is very low compared to the national average (Table 5.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is better aligned to the economic characteristics of the region, as East Macedonia and Thrace receives 8.65% of the amount of ESPA allocated to Regional Operational Programs in Greece and 6.7% of the total amount of ESPA. The region has also received 10% of the Rural Development Program (Common Agricultural Policy), a figure that is the third highest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 5.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of East Macedonia and Thrace includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[41] that altogether define the development strategy of the Region. The development strategy, after a period of open consultation with regional stakeholders, is decided by the Regional Council of East Macedonia and Thrace, included in the programming documents of the ROP and finally approved by the European Commission. The Vision of the region of East Macedonia and Thrace is to 'reconstruct the productive model in a way so to transform it into a tourist destination of excellence and an important industrial pole, utilizing its comparative advantage in the agro-food complex, its rich endogenous potential and its geographical location and promoting social cohesion by mobilizing existing and new social collectibles'.

The ROP of East Macedonia and Thrace includes a number of strategic priorities and goals that define the development strategy of the region. The strategy is based on a model of endogenous growth (and not the assisted/sheltered development models of the past) aiming to advance the utilization of regional natural and human resources, the built and multi-cultural environment and its geographical position as a transportation and energy bridge in South-eastern Europe, Black Sea and the Mediterranean.

The development strategy aims to exploit better the comparative advantages of the region, to improve the competitiveness of the productive base with the adaptation of technological change, regionally produced innovation, the creation of value chains and the expansion of exports. At the same time, the strategy aims to improve basic social services in health and elderly or disabled/excluded support, increase employment and combat poverty, develop social economy, and improve infrastructure and services for education. Finally, it aims to protect the natural environment with full compliance to the obligations for waste management and recycling infrastructure, develop a network of protected areas, promote a sustainable utilization of natural resources and promote renewable energy investment and develop energy infrastructure (networks and storage) for the participation in trans-European energy networks crossing the region.

This strategy is summarized in four General Objectives and four Priority Axes. The General Objectives are:

1. expansion and broadening of economic activity
2. increase employment
3. improve social cohesion
4. improve the attractiveness of East Macedonia and Thrace as a residential and investment choice

The Regional Operational Program (ROP) of East Macedonia and Thrace is about 522 million euro, in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than half of these funds address environmental (37.5%) and transport (17.0%) projects or actions, while an equally high share of resources is devoted to human resources development and protection (32.5%). A relatively smaller amount is available for actions to support entrepreneurship (8.2%) and, almost residual, research and technology (2.9%) (Table 5.10).

[41] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of East Macedonia and Thrace assigns more resources to environment (119%), and less to transport (95%), human capital and social care (89%), and entrepreneurship (76%).

The progress in the implementation of the ROP is slow, since about 76.4% of the budget of ROP (by the beginning of December 2020) has been contracted for projects and actions, and just 36.7% actually disbursed. The worst progress in the implementation process in terms of spending is observed in the research and technology (7.7%) priorities, and the best (52.8%) in the transport (Table 5.10).

Table 5.10. Indicators for the Regional Operational Programs of the region of East Macedonia and Thrace

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP total budget. (Public expenditure) (€), 2014-2020	457,129,769	*3*	8.65[a]	76.4	*87 (11)*	36.7	*84 (12)*	
% ROP in research and technology	2.9	*12*	64	30.7	*67 (10)*	7.7	*58 (7)*	
% ROP in entrepreneurship	8.2	*6*	100	99.1	*64 (9)*	35.7	*96 (6)*	
% ROP in human capital and social care	32.5	*10*	87	103.3	*99 (7)*	49.4	*86 (10)*	
% ROP in environment	37.5	*10*	121	45.4	*74 (13)*	21.9	*65 (11)*	
% ROP in transport	17.0	*7*	99	94.8	*119 (4)*	52.8	*120 (6)*	
% ROP in technical support	2.0	*6*	99	35.0	*64 (10)*	18.6	*54 (10)*	

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 1.6 billion euros in terms of total public expenditure for funding approved projects to date) allocated to East Macedonia and Thrace by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[42]. Table 5.11 highlights that the SOPs of ESPA directed to East Macedonia and Thrace devote a relatively higher share of funds to human capital and social care, and entrepreneurship (31.7% and 26.2% respectively), a relatively lower share to environment (21%), research and technology and transport (10.6% and 3.7%,

[42] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

respectively). These programs also reserve some resources for the restructuring and modernization of public administration in East Macedonia and Thrace (2.4%).

Table 5.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of East Macedonia and Thrace

Indicator	Regional indicator							
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*	
ESPA budget total (€), 2014-2020	1,592,034,293.06	*5*	6.25[a]	69.7	*94 (10)*	36.7	*95 (11)*	
% ESPA in research and technology	10.6	*5*	106	41.8	*84 (12)*	19.8	*98 (9)*	
% ESPA in entrepreneurship	26.2	*6*	99	98.3	*102 (4)*	46.3	*100 (6)*	
% ESPA in human capital and social care	31.7	*1*	132	63.9	*68 (12)*	37.7	*75 (12)*	
% ESPA in environment	21.0	*11*	84	52.9	*110 (5)*	26.6	*99 (7)*	
% ESPA in transport	3.7	*11*	36	68.7	*117 (6)*	47.3	*127 (5)*	
% ESPA in administration	2.4	*2*	156	69.2	*96 (9)*	36.3	*107 (6)*	
% ESPA in technical support	4.3	*1*	161	91.3	*102 (2)*	53.5	*101 (7)*	

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection results by the combined allocation of funds in both the ROP of East Macedonia and Thrace and the SOPs. Table 5.12 shows that relevant resources are available in the ROP for human capital and social inclusion (148.7 million euros). Most of these funds are addressing social inclusion actions (100 million euros), a smaller share is for education and lifelong learning (43 million euros) and actions supporting employment (nearly 6 million euros). However, education and employment actions are more strongly supported by the SOPs, as shown in Table 5.13. The option to

focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 78.5% and payments 41.8% of the budget.

The ROP budget also reserves 37 million euros to smart specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is almost fully contracted (93.7%), but payments are still low. In addition to the funds allocated in the ROP, East Macedonia and Thrace receives for these fields a significantly larger amount from the Sectoral Programs.

Table 5.12. The funds of the ROP of East Macedonia and Thrace for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	148,736,578.00	204,264,377	153,655,031	75.2	73,471,979	36.0
Employment	5,967,892.00	1,555,775	131,818	8.5	21,363	1.4
Education and Lifelong Learning	42,727,843.00	56,781,712	38,911,275	68.5	12,393,645	21.8
Social Inclusion	100,040,843.00	145,926,890	114,611,939	78.5	61,056,970.90	41.8
Innovation	13,064,327.00	4,968,274	4,011,489	80.7	1,000,352	20.1
Research Technology Innovation	9,000,000.00	4,011,489	4,011,489	100.0	1,000,352	24.9
Information and Communication Technologies	4,064,327.00	956,785	0	0.0	0	0.0
Smart Specialization	37,274,148.00	39,009,836	36,951,636	94.7	13,315,945	34.1
SME's Competitiveness	37,274,148.00	39,009,836	36,951,636	94.7	13,315,945	34.1

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

Table 5.13 shows that East Macedonia and Thrace receives from the respective SOPs additional 505 million euros for human capital and social inclusion, 418 million euros for Smart Specialization and 168 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets substantial support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the latter has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is relatively satisfactory, as 64% of the allocated budget has been contracted and 38% spent.

In addition, the analysis of the programming and implementation figures that the SOPs devote significant funds on innovation and ICT that have a high degree of contracting (99%) vis-à-vis a low degree of spending (less than 20%).

The gap between contracting and spending is explained by a number of factors. Most common factors are (i) the late start of the programs (most of them launched in 2017), (ii) cumbersome administrative procedures, (iii) but also the actual time that an R&D or innovation project needs in order to be completed. The total amount of funding indicates that innovation policies are mainly supported by the SOPs where the overall budget is much higher. However, it is worth to consider most part of the budget in these programs is directed to ICT infrastructure.

Finally, the funds allocated to Smart Specialization are business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is by 98% contracted, but again payments and absorption are still relatively low. One of the reasons for the

slow implementation of the investment projects in this case is the weak banking sector. Most investors face difficulties to get a loan or a guarantee from their banks, therefore they have to complete the investments with their own financial means.

The experience from the design and implementation of Structural Funds with respect to skills, innovation and smart specialization indicates that there are some issues to address in policy design and implementation. First, the sub-program for Research and Technology in the ROP not being activated yet possibly indicates the existence of bottlenecks, related to the implementation of the program, that need to be tackled. Although the majority of the stakeholders considers the design of the RIS3 quite satisfactory, still they reckon it is not implemented in time and according to the plan.

The second issue is related to the level of funding in the ROP. The most important development opportunities in the region are the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, as well the development of clusters and value chains of local export-oriented firms. To seize these opportunities, investments in R&D and innovation policies are required and a significant part of these policies has to be place-based. According to the findings of the OECD analysis, the structural funds would have a greater impact on the regional economy if more emphasis were placed on cooperation between the region's productive and scientific base on innovative actions promoting smart specialization.

Table 5.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to East Macedonia and Thrace

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		505,171,326	322,553,981	63.9	190,699,639	37.7
Employment		202,001,067	149,076,098	73.8	95,892,072	47.5
Education and Lifelong Learning		283,855,236	154,407,147	54.4	76,976,539	27.1
Social Inclusion		19,315,023	19,070,736	98.7	17,831,028.00	92.3
Innovation		168,242,130	70,298,698	41.8	33,312,270	19.8
Research Technology Innovation		64,731,568	22,177,171	34.3	9,726,145	15.0
Information and Communication Technologies		103,510,562	48,121,527	46.5	23,586,125	22.8
Smart Specialization		417,689,329	410,534,923	98.3	193,228,705	46.3
SME's Competitiveness		417,689,329	410,534,923	98.3	193,228,705	46.3

Note: *There is no predefined commitment for each region
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, East Macedonia and Thrace is the 8th largest regional economy in Greece characterized by a low level of development compared to the national and the EU average and a high rate of unemployment. The economy of East Macedonia and Thrace includes an important primary sector, a noteworthy secondary sector, and a large tertiary sector. Primary includes the agro-food industry performing low levels of relative productivity. Secondary sector is based, mainly, on labor-intensive industries (such as food, textiles and clothing, mining, paper, and tobacco). Tertiary sector is made of traditional-type industries (such as “mass” tourism) and of education, transport and public services, with high levels of relative productivity. East Macedonia and Thrace has, apparently, the opportunity to improve

quality and productivity, as well as local forwards and backwards linkages and competitiveness in sectors of comparative advantage, such as agro-food and administrative and support services. This study identifies opportunities in three main areas for East Macedonia and Thrace to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society
3. Enhancing the performance and impact of EU Structural Funds

Strengthening and diversifying the productive base of the regional economy

East Macedonia and Thrace specializes in agriculture and in labour-intensive manufacturing, and it has modestly diversified economic base. East Macedonia and Thrace lags behind in innovative activities, lacks significant value chains, and characterizes by limited export and low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Support the transformation and diversification of the primary sector towards quality and organic products and develop a new agro-food sector that exports to specialized and high-income markets.
2. Develop the energy sector through investments in renewable projects, such as solar, wind, hydroelectric and local energy networks, that are going to reduce energy costs in production and make the region a more attractive investment destination.
3. Utilize national and international transport networks for the development of supply chains and assembly centres for exportable goods at specific transport hubs within the region.
4. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region as the top development opportunities.
5. Develop new forms of tourism (gastronomy, agritourism, health, cruise, winter, experiences etc.), extent tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, East Macedonia and Thrace faces crucial challenges in terms of improving the innovative capacity of its productive sector. Despite the fact that the performance of East Macedonia and Thrace in terms of innovation indicators improved during the last decade, the region has, still, enough space for improvement under many aspects, e.g. the need to be more business-driven. Nevertheless, the current ROP of East Macedonia and Thrace allocates a relatively small amount of funds for R&D and innovation actions (approximately 13 million euros), which implementation, in addition, is lagging behind.

The fact that the Democritus University of Thrace is included in the Times Higher Education (Times Higher Education, 2019) global ranking in the 1001+ ranking category reflects that there is, still, significant ground for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of East Macedonia and Thrace is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC 2019).

East Macedonia and Thrace needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This is a major improvement that already resulted in the relevant

scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

1. Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. East Macedonia and Thrace needs to build further on the existing experience of the administration, the Universities, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
2. Address the issue of 'ownership' of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. East Macedonia and Thrace needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
3. Enhance the business-academy collaboration in East Macedonia and Thrace, making a better use of the available funds for industrial research and innovation. This can be caught-up by building on the experience of these actors (especially the University, but also some businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives substantial financial support from Structural Funds, whose potential is not fully exploited because of the average modest progress in the implementation of the Regional Development Program (ROP) and to some degree also of the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects complement the corresponding ROP's projects, in the sense that they do not cover the same type of actions, as regards to Thematic Objective 4 (supporting the shift towards a low-carbon economy in all sectors), Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), and Thematic Objective 7 (promoting sustainable transport and removing bottlenecks in key network infrastructures). In contrast, the centrally-implemented SOPs' projects rather compete with the ROP's ones on Thematic Objective 1 (strengthening research, technological development and innovation), Thematic Objective 3 (enhancing the competitiveness of SMEs), and Thematic Objective 8 (promoting sustainable and quality employment and supporting labour mobility), either because of contemporary calls or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in East Macedonia and Thrace, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit full steam the sub-program for Research and Technology in the ROP that are not being activated yet. Noteworthy that many local stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and business needs.
2. Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region.

4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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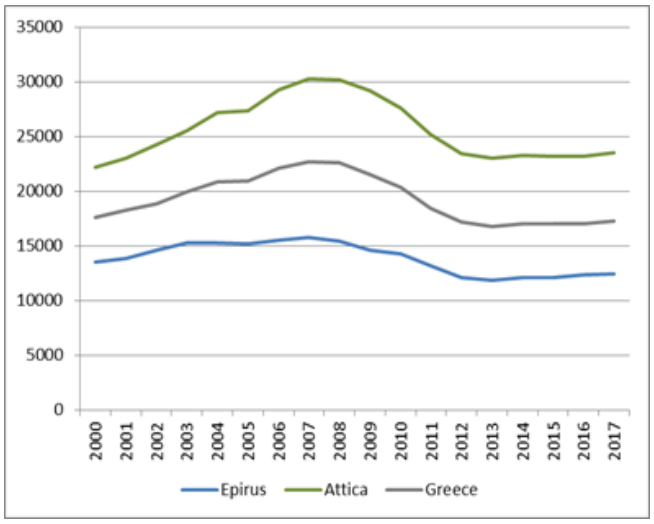
6 Epirus

Figure 6.1. Location of the region of Epirus

Figure 6.2. GDP per capita in Epirus (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, 2020

Local Government, Geography and Demography

Epirus is located in the northwest of Greece bordering with Albania. The city of Ioannina, with about 64,458 inhabitants, is the capital of the Regional Administration of Epirus and the Decentralized Administration of Epirus - Western Macedonia. The major cities in the region are four: Ioannina, Arta, Preveza and Igoumenitsa, which are the centres of the respective regional units. The region is divided into 18 municipalities, covering urban areas and rural areas (Table 6.1).

Epirus is the tenth most populated region in Greece with 334,337 inhabitants in 2018, one of the most sparsely populated regions and the least urbanised one, holding in both indexes the 11th position in the country. Ioannina is the biggest city and constitutes a medium-sized functional urban area (OECD 2019b). Igoumenitsa is a major port in Epirus and one of the largest passenger ports connecting mainland Greece with the Ionian Islands and Italy. The region has experienced a slight population decline in the post-2008 period.

Table 6.1. Information on the administrative structure of the region of Epirus

Regional Self Government	A Governor and a Regional Council are elected directly in Epirus for a 4-year term.
Decentralised administration	Epirus belongs to the Decentralized Administration of Epirus - Western Macedonia. The capital of the Decentralized Administration is the city of Ioannina.
Regional units (population)	Ioannina (168,299), Arta (68,912), Preveza (58,027), Thesprotia (44,483).
Municipalities	The Region of Epirus has 18 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Ioannina with a population of 64,458 inh. (year 2011). Ioannina is a Functional Urban Area (FUA) (medium-sized area) of 150,000 inh. (2015).
Other major cities (inhabitants)	Arta (21,596), Preveza (18,904), Igoumenitsa (9,717)
Regional institutions in Epirus	University of Epirus Regional Association of Epirus Municipalities Development Agency of Ipeiros S.A (Ipeiros S.A) Development Agency of South Ipeirou-Amvrakikou S.A (ETANAM S.A)

Source: Sources: ELSTAT (2019) OECD (2019b).

Ageing in Epirus is an important issue as the share of population over 70 years old (18.1%) is the highest in Greece and nearly 1.4 times above the EU levels, while it has also increased significantly (2.9%) during the crisis43. This is also verified from the elderly dependency ratio (45%) which is above the national average. The share of population (25-64 years) with tertiary education is 30%, which is below, but close to the national and European average. The population of the region that lives in cities is low (50.2%) and well below the national average (66%). Finally, the index of crude rate of net migration for the region of Epirus, despite the decrease in the last decade, is positive reflecting the emigration-generated population increase in the area. As Epirus is located in the northwest of Greece bordering with Albania, it has received a great amount of migration (Table 6.2).

Table 6.2. Indicators for the population characteristics of the region of Epirus

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	334,337	*10*	3[a]		-0.30	*9*
Population share (%) in the country, 2017	3.1	*10*			0.0	*10*
Population density (inh/km^2), 2018	36.3	*11*	45	31	-0.30	*9*
(%) Population >70, 2011	18.1	*1*	123	137	2.9	*6*
Youth Dependency Ratio[b], 2019	21.5	*12*	95		0.2	*4*
Elderly Dependency Ratio[b], 2019	45.0	*1*	130		2.1	*3*
(%) Population (25-64 years) with tertiary education, [e]	30.0	*3*	97	95	4.7	*4*
Urbanization ratio, 2011	50.2	*11*	66		0.6	*3*
Crude rate of net migration[d], 2017	2.5	*4*			-1.5[c]	*5*

[43] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Note: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011.
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

Epirus has a rich natural environment, national parks and wetlands. The productive structure of the region includes a strong primary sector with a high regional GDP share (8.4%), which is about 2 times as much as the national average and 5.4 times as much as the European average. The primary sector also has a very high employment share (17.5), which is 64% and 268% higher than the national higher and the EU average, respectively.

Although the relative productivity of the primary sector in Epirus (0.5) is lower when compared to the one of industry and services, the region has a better relative performance in agriculture than the other regions of the EU (25% and 47% higher than the national and EU average respectively). Epirus produces a variety of agricultural products of which the most important are cereals, citrus fruits, tobacco, and it has also a well-developed livestock which produces milk and various milk products like cheese (Table 6.3).

The region has a modest secondary sector with a share in GDP (16.8%) close to the national average and a relative productivity that is higher than the other two sectors (1.2), but just below the national average (0.94). Industrial activity includes low-skilled sectors like food, beverages and textile.

As far as the tertiary sector is concerned, this the largest sector in the region in terms of GDP (74.8%) and employment (68.7%), with a productivity that is lower than the secondary sector, but slightly above the national and the EU average (Table 6.3).

Table 6.3. Structural indicators of production in the region of Epirus

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	8.4	*5*	205	540	4.0	*5*
(%) Secondary in GDP, 2016	16.8	*7*	99	68	-1.1	*10*
(%) Tertiary in GDP, 2016	74.8	*7*	95	101	-0.1	*7*
(%) Primary in Employment, 2015	17.5	*6*	164	368	-0.8	*10*
(%) Secondary in Employment, 2015	13.8	*5*	105	63	-4.5	*8*
(%) Tertiary in Employment, 2015	68.7	*7*	90	93	1.4	*5*
(%GDP)/(% Employment) $_{Primary}$, 2016	0.5	*5*	125	147	5.5	*4*
(%GDP)/(% Employment) $_{Secondary}$, 2016	1.2	*8*	94	107	4.1	*9*
(%GDP/(% Employment) $_{Tertiary}$, 2016	1.1	*7*	105	108	-1.7	*9*

Sources: OECD (2019a), ELSTAT (2019)

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Epirus has developed a strong specialization (with LQ>1.25) in agriculture and construction, with a lower but still detectable specialization in administrative and support services (Table 6.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in agricultural sector (Table 6.4).

Epirus shows a modestly diversified production base, as it has developed some level of specialization in 10 (out of 38) NACE2 branches. Strong or high specialization is exhibited only in basic metals, while weak to modest specialization is found in agriculture, construction, health, education, mining and quarrying, food/beverages/tobacco, retail trade of motor vehicles and motorcycles, hotels and restaurants, and public administration and defence. The region displays overall specialization in 4 tradable branches.

The region could take advantage of its modestly diverse production base so to develop value chains through local forwards and backwards linkages, especially in branches in which the region exhibits specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers.[44] Only six branches appear to have regional multipliers greater than one and none of them is in tradable branches, while only two are in branches of regional specialization. This implies that in most branches, an increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

Table 6.4. Sectoral specialisation in the region of Epirus

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	1.27	*4*		
LQ in mining, energy, electricity, water supply, 2016	0.37	*9*		
LQ in manufacturing, 2016	0.91	*8*		
LQ in construction, 2016	1.71	*1*		
LQ in distr. trade, transport, accom., food serv., 2016	0.89	*7*		
LQ in information and communication, 2016	0.83	*8*		
LQ in financial and insurance activities, 2016	0.96	*5*		
LQ in professional, scientific and technical act., 2016	0.83	*7*		
LQ in administrative and support services, 2016	1.23	*3*		
LQ in other services, 2016	0.98	*8*		
RCA[b] in agricultural sector, 2012	4.1	*4*	9.0	*1*
RCA in resource-intensive sector, 2012	0.1	*11*	-9.9	*11*
RCA in labour-intensive sector, 2012	0.3	*9*	-4.0	*11*
RCA in scale-intensive sector, 2012	0.8	*7*	-4.3	*8*
RCA in specialized supplier sector, 2012	0.5	*6*	-10.9	*7*
RCA in science-based sector, 2012	1.0	*2*	4.9	*5*
Diversification of productive base[c], 2011	10 (**1**/*4*)	*6*		
Sectors with regional multiplier effects >1[d],	6(**2**/*0*)	*3*		

[44] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

2011				

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performance and current trends

Epirus is generating only 2.2% of the National GDP, being the eleventh largest regional economy in Greece. Similarly, its development level, in GDP per capita terms, is low compared to the national average (72%) and very low compared to the EU average (48%). Both GDP and GDP per capita have declined during the last decade by 2.9% and 2.6% respectively, experiencing, however, one of the lowest drops in welfare levels in the country. The productivity level in Epirus is lower compared to the national (77%) and significantly lower compared to EU figure (52%), holding the 12th position among the Greek regions. It has declined in the post-2008 period by 0.8%, which is one of the smallest in size drops among regions.

The merchandise exports of the region are equal to 6.6% of GDP holding the 10th position in the country and being well below the EU average (20%). However, the region shows progress towards a more extrovert economy, as the indicator presented an annual growth rate of 9.4% placing Epirus in the 4th place. Epirus has a low performance in the European Regional Innovation Scoreboard, ranking 6th among Greek regions, with a figure that equals to just 58% of the EU average. Its performance has slightly increased during the last decade by 0.5% (Table 6.5).

Epirus is experiencing a high unemployment rate (20.5%) that is close to the national average, but dramatically higher than the EU average. Unemployment on average has increased by 7.3% during the last decade, while the employment ratio has declined by 1.9%.

Table 6.5. Indicators of development, competitiveness and welfare for the region of Epirus

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	OECD=100	Annual change (%)	*National Rank*
GDP, 2016 (constant 2010 prices, ml. €)	4,196	*10*	2[a]			-2.9	*3*
GDP per capita, 2016 (€/inh.)	12,488	*12*	72	48	46	-2.6	*3*
GDP share (%) in the country, 2017	2.2	*11*				4.2	*4*
Employment share (%) in the country, 2017	2.8	*10*				-0.5	*12*
(%) Employment/Population, 2018	37.4	*12*	89	88		-1.9	*12*
(%) Unemployment, 2018	20.5	*5*	105	293	16[d]	7.3	*10*
Productivity (GVA/worker, thousand	30.2	*12*	77	52[c]		-0.8	*2*

€), 2017							
Merchandise exports to GDP ratio, 2016	6.6	*10*	47	20		9.4	*4*
Regional Innovation Scoreboard, 2017	59.2	*6*		58		0.5[b]	*7*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

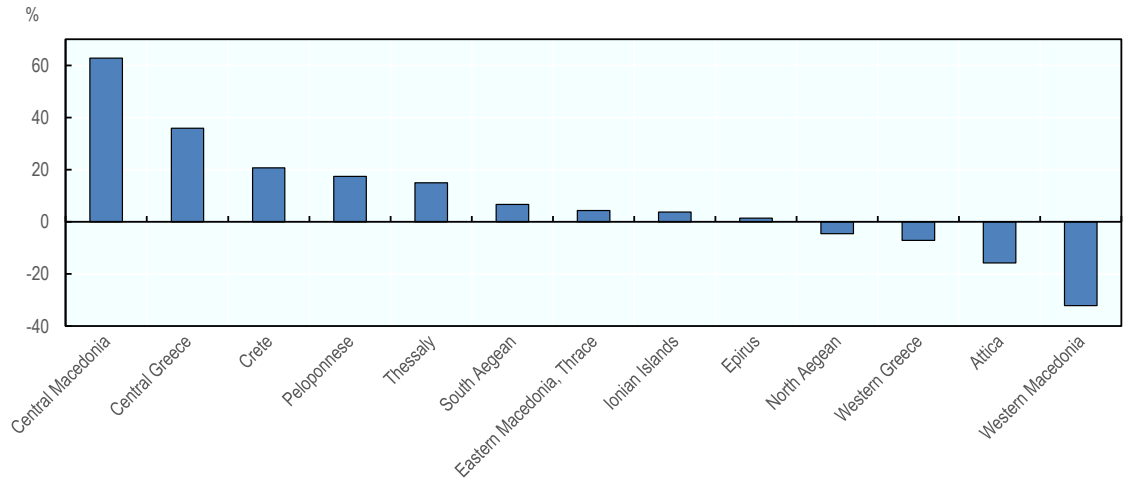
According to the analysis undertaken and the Social Scoreboard indicators published by Eurostat (2019b), Epirus is facing serious social problems related to the condition of its human resources (Table 6.6). The figures show that 7.8% of the population of Epirus does not have access to health services, and the share of population in danger of poverty and social exclusion is 31%, values that are slightly better than the national average. However, in terms of long-term unemployment (77.2%) and young people excluded from education or the labour market (18.2%) the region has an inferior performance compared to the national average (Table 6.6). Between 2015 and 2017, Epirus contributed to the growth of national GDP for about 1.5% (Figure 6.3).

Table 6.6. Social indicators for the region of Epirus, 2018

Social indicator (year)	Greece	Epirus
Share of population with lack of access to health services	8.8	7.8
Long-term unemployment	70.3	77.2
Youth aged 15-24 excluded from education or the labour market	14.1	18.2
Share of people in danger of poverty or social exclusion	31.8	31.3

Source: Eurostat (2019b)

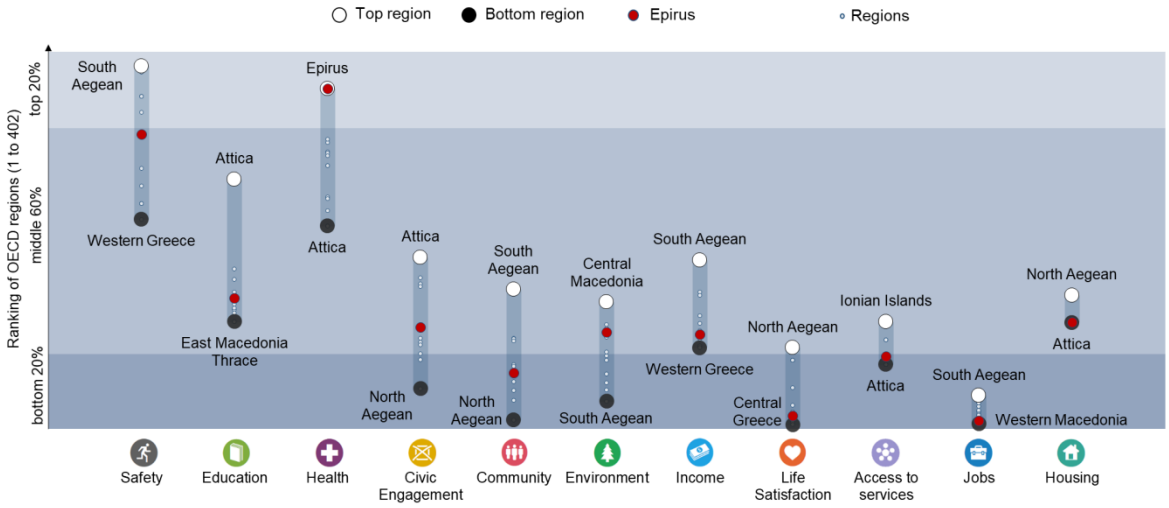
Figure 6.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Epirus is varying in a number of well-being indicators estimated by OECD (2019c, figure 6.4 and table 6.7). Compared to 402 OECD regions, Epirus belongs to the middle 60% group in the fields of safety, education, health, civic engagement, environment, income, and housing. Compared to the other OECD regions, Epirus is having a relatively high score in safety and health and very low scores in terms of education, civic engagement, community, income, access to services and jobs. When compared to the other Greek regions, Epirus is above the national average in safety and health, close to the national average in community, environment, life satisfaction and housing, below the national average in education, civic engagement, income, access to services and jobs.

Figure 6.4. Regional well-being indicators for Epirus



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 6.7. Individual well-being indicators outcomes in Epirus and Greece

	Country Average	OECD median region	Epirus
Safety			
Homicide Rate (per 100 000 people), 2016	0.8	1.3	0.6
Education			
Labour force with at least upper secondary education (%), 2017	76.7	81.7	70.0
Health			
Life Expectancy at birth (years), 2016	81.5	80.4	83.4
Age adjusted mortality rate (per 1 000 people), 2016	7.5	8.1	6.4
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63.6	70.9	59.0
Community			
Perceived social network support (%), 2013	81.1	91.4	80.9
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18.4	12.4	17.6
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	11 800
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5.6	6.8	5.1
Access to services			
Households with broadband access (%), 2017	65.0	78.0	62.0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53.7	67.7	50.6
Unemployment rate 15 to 64 years old (%), 2017	21.8	5.5	25.2
Housing			
Rooms per person, 2016	1.5	1.8	1.5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

Considering aquaculture, 13% of Greece's sea farms are located in the region of Epirus (9% in Thesprotia and 4% in Preveza), which accounts 6.9% of overall aquaculture-related jobs in Greece. Two, Thesprotia and Preveza, are the areas classified as PAYs[45].

[45] PAYs are areas dedicated for the development of aquaculture activity, either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in significant margin for further development. Category A of PAYs includes highly developed areas, with significant concentration of sea farms that need to be modernized and improved, in order to protect the environment. For those areas, the creation of an AZA is mandatory, in order to promote the organized development of aquaculture. On the contrary, areas with high value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

The region of Epirus harbours 4% of Greece's total fishing fleet, counting for about 1% of Greece's fishing capacity.

Epirus has four ports: Igoumenitsa that has national importance, Preveza, mainly a commercial port, and the smallsmall tourist ports of Parga and Sagiada. The port of Igoumenitsa provides mainly transportation services for passengers; the main lines of ferry connect the region with the Ionian Islands (interior lines) and with Italy (international lines). Through the period 1996 - 2010, the port's traffic faced and enormous rise with the passenger traffic increased by 50.5% for the interior lines and 26.2% for the international lines. However, over the period 2010 - 2019 the passenger traffic decreased by 2%. The ports of Igoumenitsa and Preveza may also host cruise boats, However, while cruise ship arrivals in Igoumenitsa's port remained stable over the years, arrivals in Preveza's port almost zeroed between 2015 to 2019.

Revenues from maritime tourism in Epirus in 2018 represented 1% (€ 306 million) of the total incoming tourism revenues of the country, while the direct contribution of tourism to the GDP of the Region was 7%. The annual number of visitors in 2019 reached 1,033,200 people with a turnover of € 261 million. Visitors increased by 44% from 2016 to 2019. Coastal tourism is particularly developed in the Ionian coastal area of the Epirus, especially in Parga and Syvota.

Enabling Factors

Transport, health digital infrastructure and environment

The region of Epirus includes the area of Igoumenitsa that constitutes the main port of West Greece with significant commercial and passenger traffic, being part of the core network of Europe. For this reason, its transport infrastructure, and specifically the road network and the freight transport as well as the number of passengers in maritime transport is above the national average. On the other hand, air transport traffic is low and well below the national average, while the region has two airports in comprehensive networks.

In terms of health infrastructure, the region holds the fourth position in the country with respect to the number of hospital beds per inhabitant, while during the crisis period the indicator presented a significant decrease.

Finally, air pollution in Epirus is in moderate-low levels compared to the other regions (8th place) and presents one of the highest rates of decline in the country the last decade (by 2.4%) (Table 6.8).

Table 6.8. Indicators of infrastructure for the region of Epirus

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	38.0	*3*	124		
Commercial airports	2(*2*)[c]	*5*	5[a]		
Passengers in air transport/1000 inh, 2016	0.3	*11*	7	-3.4	*12*
Commercial ports	2(**1**)[c]	*11*	2[a]		
Passengers in maritime transport/1000 inh, 2016	7.3	*3*	249	-0.6	*4*
Road freight transport (thousand tons/inh), 2017	47.3	*4*	102	1.3[b]	*8*
Hospital beds/10,000inh., 2015	42.5	*4*	100.4	-2.1	*8*
Air Pollution in PM2.5 (µg/m³), 2017	14.2	*8*		-2.4	*10*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In the case of Epirus, the figures show that R&D-related expenditure is close to the national average, but this is only due to the performance of the tertiary education (the University of Ioannina), which in terms of R&D expenditure per capita holds the first position in the country (Table 6.9).

On the other hand, the R&D expenditure in the public and private sector are quite below the national average, although a significant increase of the indicator is observed in the private sector in the post-2008 period.

In terms of patent applications per million inhabitants, Epirus holds the ninth position in the country which is far below the national average (21%) indicating a significant gap with the first runner (Attica). Moreover, the index deteriorated during the crisis period (2008-15) presenting a decline of 5.2%.

Table 6.9. Indicators of innovation and development policies for the region of Epirus

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	134.0	*4*	83	4.0[b]	*9*
R&D Expenditure in firms (€/inh), 2016	15.6	*7*	23	33.7[b]	*2*
R&D Expenditure in public sector (€/inh), 2016	16.1	*9*	40	16.3[b]	*6*
R&D Expenditure, tertiary education (€/inh), 2016	101.8	*1*	198	1.8[b]	*8*
Patent applications per million inhabitants, 2015	2.0	*9*	21	-5.2	*7*
Public Investment (€), 2017	81,086,190	*10*	3[a]	-5.3	*8*
Public Investment per head (€/inh), 2017	241.9	*6*	87	-5.3	*9*
% ESPA allocated in the region	5.4	*8*			
% National Rural Development Program allocated to the region	3.1	*10*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Source: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020)

Public Investments and European Structural Funds in Epirus

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is considered an indication of the commitment of the State to regional cohesion and balanced growth. Epirus receives 3% of the Public Investment national budget against a population share of 3.1% and a GDP share of 2.2%. As a result, the per capita figure is close to the national average (Table 6.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics of the region, as Epirus receives 5.6% of the amount of ESPA allocated to Regional Operational Programs in Greece and 5.4% of the total amount of ESPA. Epirus has also received 3.1% of the Rural Development Program (Common Agricultural Policy), a figure that is one of the lowest among the Greek regions (Table 6.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Epirus includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[46] that altogether define the development strategy of the Region. The development strategy, after a period of open consultation with regional stakeholders, is decided by the Regional Council of Epirus, included in the programming documents of the ROP and finally approved by the European Commission. The Vision of the region of Epirus is 'to become worth-living for and self-sustained Region, with an outward-oriented growth, focusing on productive activities that constitute its comparative advantages and enhance local identity, respecting its environment, history and citizens'.

The strategic Objectives of the ROP are stemming from the 11 Thematic Objectives for the programming period 2014-20. Whence, they are tailored to the specific conditions of Epirus so to ensure the ROP to be consistent and focused on existing regional development problems. They are:

1. Enhancing regional competitiveness through the development of innovation and information and communication technologies.
2. Protecting the environment and promoting sustainable development.
3. Strengthening transport infrastructure.
4. Strengthening education, health and welfare infrastructure.
5. Developing human resources, fostering social inclusion and fighting against discriminations.

The Regional Operational Program (ROP) of Epirus is about 295 million euro, in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than half of these funds are directed to environment (35.6%) and transport (18.7%) projects or actions, while an equally high

[46] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

share of resources is devoted to human resources development and protection (28.9%). A relatively smaller amount is available for actions in support of entrepreneurship (8.4%) and for research and technology (6.4%) (Table 6.10).

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Epirus assigns more resources to research and technology (128%), environment (127%) and transport (102%) and less to entrepreneurship (78%) and human capital and social care (75%).

The progress of the ROP is relatively slow in its implementation: about 84.4% of the budget (by the beginning of December 2020) has been contracted for projects and actions whereas 44.8% actually spent. The slowest progress in terms of spending is observed in the research and technology (13.1%), the transport (14.9%) priorities and the best in the human capital and social care (71.2%).

Table 6.10. Indicators for the Regional Operational Programs of the region of Epirus

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP total budget. (Public expenditure) (€), 2014-2020	295,504,762	*7*	5.59[a]	84.4	*97 (8)*	44.8	*102 (5)*	
% ROP in research and technology	6.4	*2*	144	63.2	*137 (4)*	13.1	*100 (4)*	
% ROP in entrepreneurship	8.4	*5*	103	92.1	*59 (10)*	34.3	*92 (7)*	
% ROP in human capital and social care	28.9	*12*	77	123.8	*118 (2)*	71.2	*124 (2)*	
% ROP in environment	35.6	*6*	115	71.5	*117 (3)*	47.2	*139 (2)*	
% ROP in transport	18.7	*4*	109	54.9	*69 (10)*	14.9	*34 (12)*	
% ROP in technical support	2.0	*7*	98	59.2	*108 (4)*	46.1	*134 (3)*	

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020).

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 1.35 billion euros in terms of total public expenditure for funding approved projects to date) allocated to Epirus by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[47]. In Table 6.11 we observe that the SOPs of ESPA directed to Epirus devote a relatively higher share to entrepreneurship, environment

[47] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

and human capital and social care, and relatively lower shares in research and technology and in transport. These programs also reserve some resources for the restructuring and modernization of public administration in Epirus (2.7%).

Table 6.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Epirus

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-2020	1,358,279,672.94	*8*	5.33[a]	73.8	*100 (6)*	39.4	*102 (7)*
% ESPA in research and technology	13.3	3	134	42.7	*86 (10)*	22.1	*110 (6)*
% ESPA in entrepreneurship	32.1	*3*	121	98.4	*102 (3)*	44.6	*96 (10)*
% ESPA in human capital and social care	20.9	*11*	87	68.9	*74 (10)*	42.7	*84 (10)*
% ESPA in environment	21.6	*9*	86	56.1	*116 (2)*	34.5	*128 (2)*
% ESPA in transport	5.7	*10*	55	85.4	*145 (3)*	48.4	*130 (4)*
% ESPA in administration	2.7	*1*	175	67.8	*94 (13)*	38.8	*114 (1)*
% ESPA in technical support	3.7	*3*	138	90.6	*101 (4)*	54.1	*102 (3)*

Note: a: the value is the national share of the region
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is represented by the combined allocation of funds in both the ROP of Epirus and the SOPs. Table 6.12 shows that substantial resources are available in the ROP for human capital and social inclusion (85.4 million euros). Most of these funds are addressing social inclusion actions (66 million euros), a smaller share is for education and lifelong learning (16 million euros) and actions supporting employment (3 million euros). However, as it is shown in Table 6.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 89.8% and payments 49.7 of the budget.

The ROP budget reserves further 24.7 million euros to smart specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is fully contracted, but payments are still low. In addition to the funds allocated in the ROP, Epirus receives a significantly larger amount from the Sectoral Programs in these fields.

Table 6.12. The funds of the ROP of Epirus for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	85,380,349.00	120,828,324	105,720,516	87.5	60,771,462	50.3
Employment	3,188,195.00	2,912,004	1,672,488	57.4	37,243	1.3
Education and Lifelong Learning	15,970,340.00	16,781,172	13,185,188	78.6	10,421,318	62.1
Social Inclusion	66,221,814.00	101,135,148	90,862,839	89.8	50,312,901.30	49.7
Innovation	19,038,948.00	17,214,920	12,030,122	69.9	2,496,577	14.5
Research Technology Innovation	10,000,000.00	13,143,550	11,407,554	86.8	2,471,470	18.8
Information and Communication Technologies	9,038,948.00	4,071,371	622,568	15.3	25,107	0.6
Smart Specialization	24,725,019.00	22,759,791	22,759,791	100.0	8,478,834	37.3
SME's Competitiveness	24,725,019.00	22,759,791	22,759,791	100.0	8,478,834	37.3

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Table 6.13 shows that Epirus receives from the respective SOPs additional 284.5 million euros for human capital and social inclusion, 436 million euros for Smart Specialization and 181 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the later has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is relatively satisfactory, as 68.9% of the allocated budget has been contracted and 42.7% has been spent.

In addition, the analysis of the programming and implementation figures that the SOPs devote significant funds on innovation and ICT that fairly good degree of contracting (42.7%), but a low degree of spending (22.1%).

The gap between contracting and spending is explained by a number of factors. Most common factors are (i) the late start of the programs (most of them launched in 2017), (ii) cumbersome administrative procedures, (iii) but also the actual time that an R&D or innovation project needs in order to be completed. The total amount of funding indicates that innovation policies are mainly supported by the SOPs where the budget is much higher. Noteworthy to consider that the main part of the budget in these programs addresses ICT infrastructure.

Finally, the funds allocated to Smart Specialization are mostly business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is almost fully contracted, but again payments and absorption are still low (44.6%). One of the reasons for the slow implementation of the investment projects is the weak banking sector. Most investors face difficulties to get a loan or a guarantee from their banks, therefore they have to complete their investment with their own financial means.

The experience from the design and implementation of Structural Funds with respect to skills, innovation and smart specialization indicates that there are some issues to address in policy design and implementation. First, the sub-program for Research and Technology in the ROP not being activated in

time possibly indicates serious difficulties related to the management of the program. Although the majority of the stakeholders considers the design of the RIS3 quite satisfactory, it is not implemented in time and according to the plan.

The second issue relates to the level of funding in the ROP. The most important development opportunities in the region are the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, as well the development of clusters and value chains of local export oriented firms. To seize these opportunities, investments in R&D and innovation policies are required and a significant part of these policies has to be place-based. According to the findings of the survey, the structural funds would have a greater impact on the regional economy if more emphasis were placed on cooperation between the region's productive and scientific base in innovative actions promoting smart specialization.

Table 6.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Epirus

	Committed Public Funds*	Allocated Budget	Contracted	Contracted as a share of allocated Budget	Payments	Payments as a share of allocated Budget
Skills		284,533,577	195,954,954	68.9	121,589,782	42.7
Employment		149,324,944	110,941,137	74.3	72,832,870	48.8
Education and Lifelong Learning		121,833,650	71,784,099	58.9	36,455,147	29.9
Social Inclusion		13,374,982	13,229,717	98.9	12,301,765.12	92.0
Innovation		180,977,631	77,359,786	42.7	40,066,981	22.1
Research Technology Innovation		57,192,370	18,230,397	31.9	7,623,751	13.3
Information and Communication Technologies		123,785,261	59,129,389	47.8	32,443,230	26.2
Smart Specialization		436,269,226	429,443,749	98.4	194,487,989	44.6
SME's Competitiveness		436,269,226	429,443,749	98.4	194,487,989	44.6

Note: *There is no predefined commitment for each region
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Epirus is the 11th largest regional economy in Greece characterized by a low level of development compared to the national and the EU average and a high rate of unemployment. The economy of Epirus includes an important primary sector, a modest secondary sector, and a large tertiary sector. The primary sector is based on agriculture and livestock with low levels of relative productivity. Construction and on labour-intensive industries (such as food, beverages, and textile) are predominant in the secondary that exhibits satisfactory levels of relative productivity. The tertiary sector relies on traditional-type industries (such as “mass” tourism) and on public administration and defence, and exhibits satisfactory levels of relative productivity. Epirus has, apparently, the opportunity to link the development of the agriculture to the food and the tourism industries. This study identifies opportunities in three main areas for Epirus to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy.
2. Pursuing an innovation-oriented and knowledge-intensive regional society.
3. Enhancing the performance and impact of EU Structural Funds.

Strengthening and diversifying the productive base of the regional economy

Epirus specializes in agriculture and in labour-intensive manufacturing, and it has a diversified economic base. Epirus lags behind in innovative activities, lacks significant value chains and shows limited export and low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Protect the environment and cultural, architectural and historical heritage, improving local quality features and services and highlighting quality of life in a strong advantage that is going to attract new residents to the region.
2. Support the transformation and diversification of the primary sector towards quality and organic products and develop a new agro-food sector that exports to specialized and high-income markets.
3. Develop new forms of tourism (gastronomy, agritourism, health, cruise, winter, experiences etc.), extent tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.
4. Transform local and regional government into an effective mechanism for supporting economic activities and new investment in the region by developing appropriate development and spatial plans.
5. Develop value chains with strong input-output relationships in branches of comparative advantage with the aim of retaining locally most of the added value of the exportable products and services.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Epirus faces significant challenges in terms of improving the innovative capacity of its productive sector. Despite the fact that the performance of Epirus in terms of innovation indicators improved during the last decade, the region has, still, enough room for further improvement. Nevertheless, the current ROP of Epirus allocates a relatively small amount of funds for R&D and innovation actions (approximately 19 million euros), whose implementation, in addition, is experiencing a serious delay.

The fact that the University of Ioannina appears in the Times Higher Education (Times Higher Education, 2019) global ranking in the 601-800 ranking category, indicates that there are unexploited possibilities for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of Epirus is lagging behind in terms of innovative capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

Epirus needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This is a major improvement that already resulted in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

1. Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Epirus needs to build further on the existing experience of the administration, the University, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
2. Address the issue of ‘ownership’ of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and

policy capabilities within the regional R&D community. Epirus needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.

3. Enhance the business-science base collaboration in Epirus, making a better use of the available funds for industrial research and innovation. This can be built on the experience of these actors (especially the University, but also some businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, whose potential is not fully exploited because of the modest progress in the implementation of the Regional Development Program (ROP) and the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP in order to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects retain a complementary relation with the corresponding ROP's projects as regards to Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), in the sense that they do not cover the same type of actions.

To enhance the overall performance and impact of the Structural Funds in Epirus, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit full steam the sub-program for Research and Technology that is not fully activated yet. Some regional stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
2. Better focus the ROP financial intervention, targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.
4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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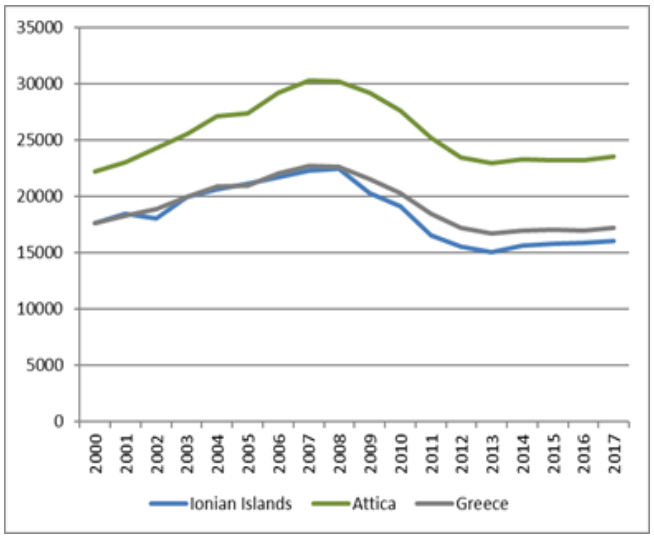
7 Ionian Islands

Figure 7.1. Location of the region of Ionian Islands

Figure 7.2. GDP per capita in Ionian Islands (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

The region of Ionian Islands is located in the western part of Greece and has no land borders, but only marine borders with Italy and Albania. The region of Ionian Islands also has marine borders with Epirus and Western Greece. One of the islands, namely Lefkada, is connected to mainland Greece with a bridge. The city of Kerkira (Corfu) is the capital of the Regional Administration of Ionian Islands. The region is part of the Decentralized Administration of Peloponnese, Western Greece and Ionian Islands. The major cities of the region of are Kerkira, Argostoli, Zakynthos, Lefkada, which are the centres of the regional units of Kerkira, Kefalonia, Zakynthos and Lefkada respectively. The region includes also a fifth regional unit, which is the unit of Ithaki with the city of Ithaki as a centre. Moreover, the region is divided into 11 municipalities covering all the larger and smaller islands. (Table 7.1).

Ionian Islands is the less populated region of Greece with 204,562 inhabitants in 2018, and the less urbanized. Kerkira is a major port city and a significant commercial hub, but all islands apparently have commercial ports and are connected with various mainland Greek ports. The region has experienced a

slight population decline in the post-2008 period and a corresponding decreasing trend in its population density, which is a bit above the national average but less than the EU average. The share of population (25-64 years) with tertiary education is 20.1%, which is the lowest in the country and far below the national and European average. The population of the region lives predominantly in small cities, as the urbanization rate is 36.5%, a value that is almost half the national average.

Table 7.1. Information on the administrative structure of the region of Ionian Islands

Regional Administration	A Governor and a Regional Council are elected directly in Ionian Islands for a 4-year term.
Decentralised administration	Ionian Islands belongs to the Decentralized Administration of Peloponnese, Western Greece and Ionian Islands. The capital of the Decentralized Administration is the city of Patras.
Regional units (population)	Kerkira (115,473), Kefalonia (38,082), Zakinthos (43,385), Lefkada (23,912), Ithaki (3,209)
Municipalities	The Region of Ionian Islands has 11 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Kerkira with a population of 25,212 inh. (year 2011).
Other major cities (inhabitants)	Argostoli (10,362), Zakynthos (9,778), Lefkada (8,611), (year 2011)
Regional institutions in Ionian Islnds	Ionian University Regional Association of Ionian Islands Municipalities Ionian Islands Development Agency S.A.

Source: ELSTAT (2019) OECD (2019b)

Ageing in Ionian Islands is an important issue as the share of population over 70 years old is higher compared to the Greek or EU levels and has also increased significantly (1.47% annually) during the crisis.[48] This is also verified from the elderly dependency ratio that, in 2019, was at the level of 37.0%, which is above the national average (Table 7.2). Finally, the index of crude rate of net migration for the region of Ionian Islands, though reduced (3.5%), is slightly positive, reflecting an immigration-generated population increase in the area.

Table 7.2. Indicators for the population characteristics of the region of Ionian Islands

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	204,562	*13*	2[a]		-0.14	*6*
Population share (%) in the country, 2017	1.9	*12*			1.7	*6*
Population density (inh/km^2), 2018	88.7	*3*	109	75	-0.14	*6*
(%) Population >70, 2011	16.6	*7*	112	125	1.47	*12*
Youth Dependency Ratio[b], 2019	23.36	*4*	104		0.47	*3*
Elderly Dependency Ratio[b], 2019	36.95	*6*	107		1.25	*8*
(%) Population (25-64 years) with tertiary education[e]	20.1	*13*	65	64	5	*3*

[48] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Urbanization ratio, 2011	36.5	*13*	48		-0.2	*13*
Crude rate of net migration[d], 2017	0.4	*9*			-3.5[c]	*12*

Note: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region relies heavily on the tertiary sector, which accounts for 87.7% of GDP (the highest share in the country). The tertiary sector displays a higher GDP share than the national average (111%) as well as the European average (118%). It also has a higher relative productivity comparing to national and European average. It is based on significant tourism flows, as Ionian Islands is one of the most famous tourism destinations in the whole Mediterranean.

Table 7.3. Indicators of the regional economy of Ionian Islands

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	4.2	*11*	101	267	5.6	*1*
(%) Secondary in GDP, 2016	8.0	*13*	47	32	-2.5	*13*
(%) Tertiary in GDP, 2016	87.8	*1*	111	118	0.0	*3*
(%) Primary in Employment, 2015	13.0	*10*	122	273	-1.9	*13*
(%) Secondary in Employment, 2015	10.7	*13*	82	49	-3.2	*5*
(%) Tertiary in Employment, 2015	76.3	*3*	100	104	0.9	*11*
(%GDP)/(% Employment) Primary, 2016	0.3	*12*	83	98	8.8	*1*
(%GDP)/(% Employment) Secondary, 2016	0.7	*13*	58	65	0.8	*13*
(%GDP/(% Employment) Tertiary, 2016	1.2	*2*	111	114	-1.0	*2*

Sources: OECD (2019a), ELSTAT (2019)

The primary sector has a small share in GDP (4.2%), but a higher share in employment (13.0%), which is above the national average and well above the EU average (Table 7.3). The primary sector in the region bases on small farms and the production of locally acknowledged goods and on fishery. The region does not have a noteworthy secondary sector in terms of GDP or employment share (13th in the country). In addition, relative productivity of this sector is below the national average.

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Ionian Islands have developed a strong specialization (with LQ>1.25) in trade, transport, accommodation, food services, (LQ 1.81) and in other services (LQ 1.31) and a slight lower in professional, scientific and technical activities, (value of LQ is 1.16). (Table 7.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) only in the agricultural sector. (Table 7.4).

Table 7.4. Sectoral specialisation in the region of Ionian Islands

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	0.62	*11*		
LQ in mining, energy, electricity, water supply, 2016	0.34	*11*		
LQ in manufacturing, 2016	0.27	*12*		
LQ in construction, 2016	0.93	*7*		
LQ in distr. trade, transport, accom., food serv., 2016	1.81	*2*		
LQ in information and communication, 2016	0.57	*11*		
LQ in financial and insurance activities, 2016	0.78	*10*		
LQ in professional, scientific and technical act., 2016	1.16	*3*		
LQ in administrative and support services, 2016	0.68	*12*		
LQ in other services, 2016	1.31	*1*		
RCA[b] in agricultural sector, 2012	5.0	*2*	7.6	*2*
RCA in resource-intensive sector, 2012	0.1	*10*	-26.3	*13*
RCA in labour-intensive sector, 2012	0.0	*13*	-38.6	*13*
RCA in scale-intensive sector, 2012	0.3	*11*	-8.9	*9*
RCA in specialized supplier sector, 2012	0.0	*13*	-50.3	*13*
RCA in science-based sector, 2012	0.1	*8*	-9.5	*10*
Diversification of productive base [c], 2011	9 (**1**/*2*)	*10*		
Sectors with regional multiplier effects >1[d], 2011	3(**1**/*1*)	*8*		

Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)/A_r)/(A_(i,R)/A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)/X_r)/(X_(i,R)/X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.

At a more disaggregated level (NACE2), the Ionian Islands region shows a modestly diversified production base, as it has developed some level of specialization in 9 (out of 38) branches (Table 7.4). Strong or high specialization is exhibited in hotels and restaurants and in real estate activities, while weak to modest specialization in agriculture, in construction, in retail trade of motor vehicles and motorcycles, in retail trade (except vehicles), renting and security activities and in recreational and cultural activities. The region displays overall specialization in 2 tradable branches.

The region could take advantage of its modestly diverse production base in order to develop value chains through local forwards and backwards linkages, especially in branches in which it exhibits specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional

multipliers.[49] Only three branches appear to have regional multipliers greater than one, two of them are in tradable branches and one in a specialization branch. This implies that in most branches, an increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

Regional performances and current trends

The Ionian Islands region is generating almost 2% of the National GDP being the 12th regional economy in Greece. Its development level, in GDP per capita terms, is relatively satisfactory when compared to the national average (93%), but low when compared to the EU average (62%). Both GDP and GDP per capita have declined during the last decade by 4.2% and 4.1% respectively, experiencing one of the highest drops in welfare levels. The region is experiencing a high unemployment rate (16.5%) which is dramatically higher than the EU average (236%), but one of the lowest in relation to the country (10th position). Unemployment on average has increased by 6.9% during the last decade, while the employment ratio has declined by 0.7%.

The productivity level in Ionian Islands is the 5th higher in the country but significantly lower compared to EU figure (57%). It has declined in the post-2008 period by 2.3%, which is one of the lowest drops among regions. The exporting activity of the region is limited, as regional merchandise exports are equal to 2.81% of GDP (12th place). However, the region makes some progress towards a more extrovert economy, as the export ratio has increased by 25.82% annually. Despite this improvement in their exports as a share of GDP, the figure is still far below the national average (19%) and less than a tenth of the EU average (8%). Ionian Islands have a low performance in the European Regional Innovation Scoreboard that equals to 42% of the EU average, ranking 13th among the Greek regions. However, its performance has improved during the last decade by 0.7%, which is the sixth better performance among the Greek regions. (Table 7.5).

Table 7.5. Indicators of development, competitiveness and welfare for the region of Ionian Islands

Indicator	Regional indicator		Comparisons			Change in indicator 2008-latest year)	
	Level	National Rank	National average = 100 (national share)	EU=100	OECD	Annual change (%)	National Rank
GDP, 2016 (constant 2010 prices, ml. €)	3,311	12	2a			-4.2	13
GDP per capita, 2016 (€/inh.)	16,088	3	93	62	59%	-4.1	12
GDP share (%) in the country, 2017	1.8	12				-6.2	13
Employment share (%) in the country, 2017	1.9	12				-0.01	9
(%) Employment/Population, 2018	47.1	3	113	111		-0.7	3
(%) Unemployment, 2018	16.5	10	84	236	27d	6.9	12
Productivity (GVA/worker, thousand €), 2017	33.4	5	85	57c		-2.3	11
Merchandise exports to GDP ratio, 2016	2.8	12	19	8		25.8	1

[49] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Regional Innovation Scoreboard, 2017	42.9	13		42		0.7b	6

Notes: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

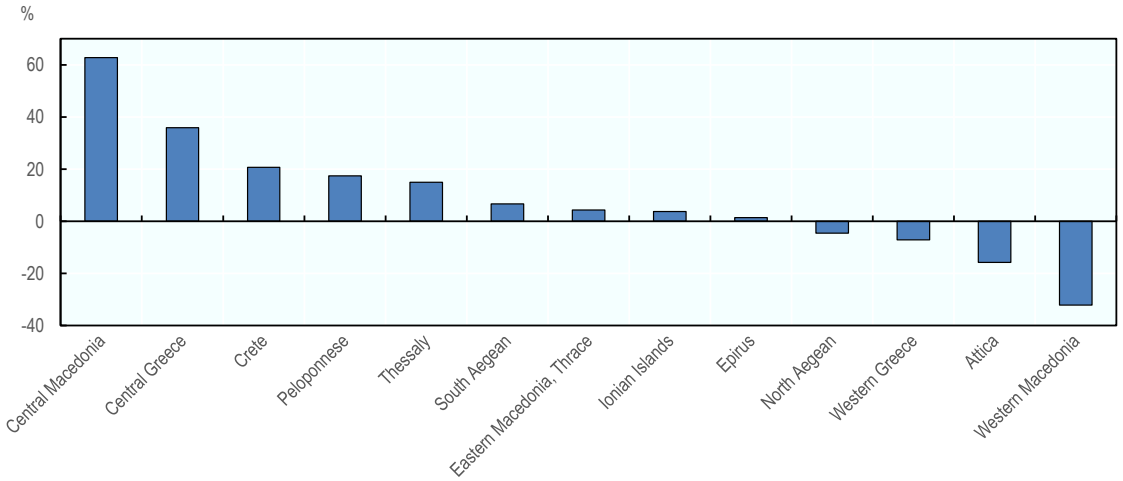
The Ionian Islands region is facing significant social problems as almost 8% of the population does not have access to health services, 54% of jobless people are long-term unemployed and 19.5% of the young people in the age group 15-24 are excluded from education or the labour market. Moreover, the share of population in danger of poverty and social exclusion is 28%. Compared to the other regions and the national average, the Ionian Islands are doing relatively better in all indicators, with the exception of the young people excluded from education and labour force, where its figure is higher (Table 7.6). Between 2015 and 2017, the Ionian Islands contributed by about 3.72% to the growth of national GDP (Figure 7.3).

Table 7.6. Social indicators for the region of Ionian Islands (2018)

Social indicator (year)	Greece	Ionian Islands
Share of population with lack of access to health services	8.80	7.8
Long-term unemployment	70.3	54.1
Youth aged 15-24 excluded from education or the labour market	14.1	19.5
Share of people in danger of poverty or social exclusion	31.8	28.0

Source: Eurostat (2019b)

Figure 7.3. Regional contribution to national GDP growth in Greece, 2015-2017

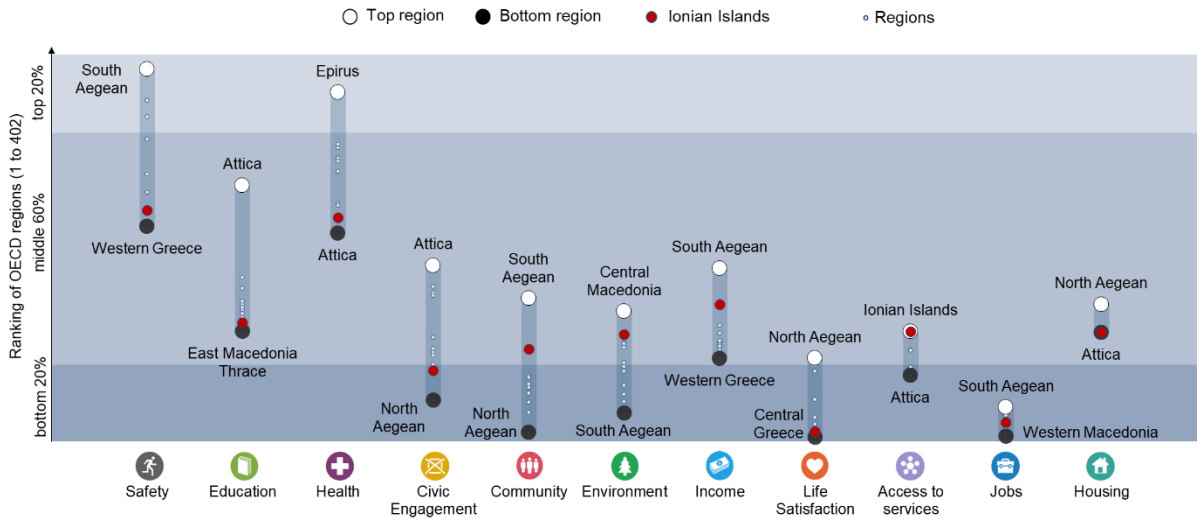


Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of the Ionian Islands is varying in a number of well-being indicators estimated by OECD (2019c, Figure 7.4 and Table 7.7). Compared to 402 OECD regions, Ionian Islands belongs to the middle 60% group in the fields of safety, education, health, community, environment, income, access to services and housing. Compared to the other OECD regions, Ionian Islands has very low scores in terms of civic engagement, life satisfaction and jobs. When compared to the other Greek regions, Ionian Islands is above

the national average in community, environment, income, access to services, close to the national average jobs and housing, and towards the bottom end of the scale in terms of all other indicators.

Figure 7.4. Regional well-being indicators for Ionian Islands



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 7.7. Individual well-being indicators outcomes in Ionian Islands and Greece

	Country Average	OECD median region	Ionian Islands
Safety			
Homicide Rate (per 100 000 people), 2016	0,8	1,3	1,0
Education			
Labour force with at least upper secondary education (%), 2017	76,7	81,7	66,9
Health			
Life Expectancy at birth (years), 2016	81,5	80,4	81,4
Age adjusted mortality rate (per 1 000 people), 2016	7,5	8,1	7,8
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63,6	70,9	52,7
Community			
Perceived social network support (%), 2013	81,1	91,4	85,5
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18,4	12,4	17,0
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	14 538
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5,6	6,8	5,0
Access to services			
Households with broadband access (%), 2017	65,0	78,0	70,0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53,7	67,7	54,5
Unemployment rate 15 to 64 years old (%), 2017	21,8	5,5	20,4
Housing			
Rooms per person, 2016	1,5	1,8	1,5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

The region of Ionian Islands is included in the European strategy for the Adriatic & Ionian macro-region EUSAIR, which foresees the blue growth and the Blue economy as a strategic pillar of development.

In the Ionian Islands, there are five PAY areas. In addition, Cephalonia and Oxeia Islands have been proposed for the creation of respectively 2 and 7 Allocated Zones of Aquaculture (AZAs).[50]

The professional fishing fleet in the Ionian Islands Region represents about 8.9% of the national fleet, and includes small coastal as well as medium and overseas fishing vessels. According to the National Fisheries Data Collection Program (EPSAD), Final Report 2014 - part B), there were 1 410 professional fishing vessels in the Ionian Islands in 2014 with a capacity of 3 873 GT (Gross Tonnage).

Two main ports are based in the Ionian Islands, one at Corfou Isl. (Kerkira port) and one at Kefalonia Isl. The port of Kerkira in Corfu provides mainly transportation services for passengers (Ferry lines). The main lines connect the island with the port of Igoumenitsa and the other Ionian Islands (interior lines), but also with Italy and Albania (international lines). In 2019, 17 180 passenger ships arrived at the port (1 864 464 passengers, 403 823 cars & trucks and 11 428 motorcycles). As for the cruise activity, according to the Greek Union of Ports, in 2019, 420 cruise ships arrived in Kerkira with 767 673 passengers. Many other smaller ports in the region provide internal passenger transportation services.

Maritime tourism plays a relevant role in the region. According to the Annual Report by the Greek Tourism Confederation (SETE), the revenues from tourism in the Ionian Islands in 2018 represented 10% (€ 1,911,200,000) of the total national revenues from tourism, with an annual number of visitors of about 3 million.

Enabling Factors

Transport, health and digital infrastructure and environment

Due to the insularity of the region, there is a significant use of maritime and air transport taking place, so the relevant indices are almost 6 times the National Average. In addition, transport infrastructure, as the relevant road density indicators show, is better than the national average and is in the second place among Greek regions. However, in terms of freight transport, Ionian Islands is in the second to last position. There are 3 airports in the Ionian Islands, all holding a comprehensive position in the Trans European Transport Network, and also there are 7 commercial ports (in all major islands), but only 1 holds a comprehensive

[50] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

position in the Trans European Transport Network. This means that most ports are mainly for local transportation and not for international purposes.

In terms of health infrastructure, the region holds the eleventh position in the country with respect to the number of hospital beds per inhabitant. The low figure is partly related to the fact that during the crisis period it experienced the highest decrease of this indicator (Table 7.8).

Finally, air pollution in Ionian Islands is significantly low compared to the other regions (12th place), and in addition it presents one of the highest rates of decline in the country (highest negative value).

Table 7.8. Indicators of infrastructure for the region of Ionian Islands

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	48.0	*2*	157		
Commercial airports	3(*3*)[c]	*3*	8[a]		
Passengers in air transport/1000 inh, 2016	23.0	*2*	548	4.4	*5*
Commercial ports	7(*1*)[c]	*7*	6[a]		
Passengers in maritime transport/1000 inh, 2016	17.1	*2*	585	-1.4	*6*
Road freight transport (thousand tons/inh), 2017	11.7	*12*	25	1.0[b]	*9*
Hospital beds/10,000inh., 2015	27.4	*11*	64.8	-3.8	*13*
Air Pollution in PM2.5 (µg/m³), 2017	12.9	*12*		-2.5	*13*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In the Ionian Islands, the figures show that R&D-related expenditure is very low, compared to the national average in all the sub-categories, but especially expenditure by firms. However, the increase in the expenditures during the crisis period (mostly by the public sector) is encouraging.

Table 7.9. Indicators of innovation and development policies for the region of Ionian Islands

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	Annual change (%)	National Rank
R&D Expenditure (€/inh), 2016	44.5	10	28	5.7b	4
R&D Expenditure in firms (€/inh), 2016	2	12	3	12.2b	8
R&D Expenditure in public sector (€/inh), 2016	15.4	10	38	19.7b	2
R&D Expenditure, tertiary education (€/inh), 2016	26.2	9	51	1.8b	7
Patent applications per million inhabitants, 2015	0	--	0	0	--
Public Investment (€), 2017	66,344,862	11	2a	-3.7	5
Public Investment per capita (€/inh), 2017	323	4	116	-3.7	5
% ESPA allocated to the region	2.6	13			
% National Rural Development Program allocated to the region	1.0	13			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Sources: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020)

The Higher Education sector has the higher expenditure figure in the region, but that is well below the national average. In terms of patent applications per million inhabitants, Ionian Islands do not present any activity (Table 7.9). This could be explained by the very weak secondary sector as shown above.

Public Investments and European Structural Funds in Ionian Islands

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is considered an indication of the commitment of the State to regional cohesion and balanced growth. The Ionian Islands region receives 2% of the Public Investment national budget against a population share of 2% and a GDP share of 2%. As a result, the per capita figure is close to the national average (Table 7.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics of the region, as Ionian Islands receives 3.82% of the amount of ESPA allocated to Regional Operational Programs in Greece and 2.6% of the total amount of ESPA. Ionian Islands have also received 1.0% of the Rural Development Program (Common Agricultural Policy), a figure that is the smallest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 7.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Ionian Islands includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[51] that define the development strategy of the Region. The Vision of the region is to make the Ionia Islands "attractive destination and viable place".

The Objectives are:

1. The diversification of the production system & standard with reference to "smart specialization"
2. Strengthening the social fabric, with a view to providing "equal opportunities"; and
3. The management of the environment & the space, in the direction of "sustainability"

Key components of this strategy are individual objectives focusing on:

- "Smart specialization", which focuses on the productive effort of the country in the fields of agri-food, gastronomy, maritime economy, thematic tourism and creative / cultural economy, using knowledge (research, technology, innovation)
- "Tackling poverty and social exclusion", which identifies the groups most vulnerable to poverty and social exclusion (poor, unemployed, migrants, Roma, disabled people, etc.) and seeks to mitigate the negative phenomenon with integrated policies.
- "Adriatic-Ionian Macro-regional strategy", which aims to tackle common challenges more effectively on issues such as the marine economy, interconnection of areas, the marine environment and attractiveness associated with tourism through efficient cooperation.

The Regional Operational Program (ROP) of Ionian Islands is about 201 million euro, in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). Almost half of these funds address environmental (41.1%) and transport (6.5%) projects or actions, while a high share of resources is devoted to human resources development and protection also (39.3%). A relatively smaller amount is available for actions in support of entrepreneurship (6.5%) and for research and technology (4.5%) (Table 7.10).

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Ionian Islands assigns more resources to environment (126%) and human capital (106%) and less to, research and technology (93%) transport (70%) and entrepreneurship (66%).

The progress in the implementation of the ROP is progressing to a good pace, since about 99.0% of the budget of ROP (by December 2020) has been contracted for projects and actions and a moderate 43.6% actually spent. The slowest progress in the implementation process in terms of spending is observed in research and technology (10.7%), in environment (26.6%) priorities, and the best in the human capital and social care (63.0%) and in transport (60.7%). Despite the variable progress, deviation from the overall performance of the ROPs are limited, with the exception of research and development and environment sub-programs (Table 7.10).

[51] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

Table 7.10. Indicators for the Regional Operational Programs of the region of Ionian Islands

Indicator	Regional indicator						
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*
ROP total budget. (Public expenditure) (€), 2014-2020	201,696,536	*11*	3.82	99.0	*113 (4)*	43.4	*99 (7)*
% ROP in research and technology	4.5	6	100	53.1	*115 (6)*	10.7	*82 (6)*
% ROP in entrepreneurship	6.5	*9*	80	99.3	*320 (1)*	38.7	*104 (5)*
% ROP in human capital and social care	39.3	*5*	105	98.2	*94 (9)*	63.0	*110 (4)*
% ROP in environment	41.1	*2*	133	48.5	*79 (11)*	26.6	*79 (9)*
% ROP in transport	6.5	*13*	38	65.2	*82 (9)*	60.7	*138 (4)*
% ROP in technical support	2.1	*4*	100	58.9	*108 (5)*	35.3	*103 (5)*

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 612 million euros, as total public expenditure for funding approved projects to date) by the ESPA Sectoral Operational Programs (SOPs) to Ionian Islands. The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[52]. Table 7.11 shows that the SOPs of ESPA directed to Ionian Islands devote a relatively higher share to entrepreneurship, more or less similar shares to human capital and environment and significantly lower resources in transport and research and technology. These programs reserve also some resources for the restructuring and modernization of public administration in Ionian Islands (1.6%) (Table 7.11).

[52] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Table 7.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Ionian Islands

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-2020	611,778,143.53	*12*	2.40[a]	79.5	*107 (4)*	40.5	*104 (5)*
% ESPA in research and technology	7.7	*11*	77	47.4	*96 (8)*	24.9	*123 (1)*
% ESPA in entrepreneurship	40.3	*2*	153	99.3	*103 (1)*	48.4	*105 (3)*
% ESPA in human capital and social care	22.1	*10*	92	104.3	*112 (4)*	54.3	*107 (3)*
% ESPA in environment	23.8	*5*	95	36.0	*75 (11)*	19.2	*71 (10)*
% ESPA in transport	2.0	*13*	19	45.3	*77 (7)*	30.1	*81 (7)*
% ESPA in administration	1.6	*5*	106	68.6	*95 (11)*	34.4	*101 (7)*
% ESPA in technical support	2.5	*7*	92	89.4	*100 (8)*	53.2	*100 (10)*

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is represented by the combined allocation of funds in both the ROP of Ionian Islands and the SOPs. Table 7.12 shows that significant resources are available in the ROP for human capital and social inclusion (79 million euros). Most of these funds are addressing social inclusion actions (55 million euros), a smaller share is for education and lifelong learning (22 million euros) and actions supporting employment (2.4 million euros). However, as it is shown in Table 7.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 82.2% and payments 51% of the budget.

Moving to R&D, Ionian Islands are characterized for a weak performance as highlighted in the introductory paragraph. Its R&D expenditure per capita is just 28% of the national average, while its expenditure by firms per capita is 3% of the national average. Despite the serious gap, the ROP of Ionian Islands allocates a relatively small amount to R&D and innovation actions (9 million euros), which in addition has not been absorbed yet as payments are only 14.8% of the allocated budget.

The ROP budget also reserves 13 million euros for smart specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is fully contracted, but payments are still very low.

Table 7.12. The funds of the ROP of Ionian Islands for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	79,273,585.00	117,071,338	77,817,608	66.5	49,949,741	42.7
Employment	2,425,939.00	1,407,366	627,734	44.6	0	0.0
Education and Lifelong Learning	22,104,342.77	39,154,411	14,278,587	36.5	11,114,316	28.4
Social Inclusion	54,743,303.23	76,509,561	62,911,288	82.2	38,835,424.98	50.8
Innovation	9,063,549.00	6,535,666	4,809,363	73.6	969,741	14.8
Research Technology Innovation	4,462,799.00	3,362,858	2,908,098	86.5	969,741	28.8
Information and Communication Technologies	4,600,750.00	3,172,808	1,901,265	59.9	0	0.0
Smart Specialization	13,173,556.00	65,780,770	65,780,770	100.0	5,101,040	7.8
SME's Competitiveness	13,173,556.00	65,780,770	65,780,770	100.0	5,101,040	7.8

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

In addition to the funds allocated in the ROP, Ionian Islands receive a significantly larger amount from the Sectoral Programs in these fields. Table 7.13 shows that Ionian Islands are estimated to receive from the respective SOPs additional 135 million euros for human capital and social inclusion, 247 million euros for Smart Specialization and 50 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs.

The policy mix in the SOPs focuses more employment and lifelong learning and very little social protection, as the later has been implemented at the regional and local level according to a more place-based approach. Performance of the sectoral skills programs is relatively satisfactory, as 104.3% of the allocated budget has been contracted and 54.3% spent. In addition, the analysis of the programming and implementation reveals that the SOPs devote significant funds on innovation and ICT that have a relatively low degree of contracting (47.4%), and even a lower degree of spending (24.9%). Finally, the funds allocated to Smart Specialization are mostly business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is almost fully contracted, but again payments and absorption are still low.

Table 7.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Ionian Islands

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		135,346,860	141,211,744	104.3	73,493,540	54.3
Employment		53,257,630	39,831,277	74.8	24,206,817	45.5
Education and Lifelong Learning		65,584,140	84,923,624	129.5	34,033,310	51.9
Social Inclusion		16,505,090	16,456,842	99.7	15,253,413.20	92.4
Innovation		46,907,588	22,256,518	47.4	11,669,810	24.9
Research Technology Innovation		9,326,620	2,122,023	22.8	1,813,729	19.4
Information and Communication Technologies		37,580,968	20,134,495	53.6	9,856,080	26.2
Smart Specialization		246,788,510	244,952,874	99.3	119,334,535	48.4
SME's Competitiveness		246,788,510	244,952,874	99.3	119,334,535	48.4

Note: *There is no predefined commitment for each region
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

The gap between contracting and spending may be explained by a number of factors, which include: (i) the late start of the programs (most of them launched only in 2017); (ii) cumbersome administrative procedures; (iii) the lengthy time that R&D and innovation projects takes to be instructed and implemented; (iv) the weak banking sector, which is reluctant to provides loans or guarantee funds for businesses investment.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, the Ionian Islands region is the second smaller regional economy in Greece characterized by modest levels of development and unemployment when compared to the national average, but a low level of development and a high rate of unemployment when compared to the EU average. The economy of Ionian Islands includes a relatively small primary and secondary sector and a large tertiary sector. The primary sector is based on agriculture and exhibits low levels of relative productivity. The secondary sector is, mainly, based on labour-intensive sectors and also exhibits low levels of relative productivity. The tertiary sector is, mainly, based on traditional-type industries (such as “mass” tourism), on trade, transport, accommodation, food services, and on professional, scientific and technical activities, performing with satisfactory levels of relative productivity. The Ionian Islands region has, apparently, the opportunity to improve quality and productivity, as well as local forwards and backwards linkages and competitiveness in sectors of comparative advantage, such as trade, transport, accommodation, and food service industries, and professional, scientific and technical activities. This study

identifies opportunities in three main areas for the Ionian Islands to improve development prospects and foster employment:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society
3. Enhancing the performance and impact of EU Structural funds

Strengthening and diversifying the productive base of the regional economy

The Ionian Islands specialize in tourism and in trade, transport, accommodation, and food services, and have a modestly diversified economic base. They lag behind in innovative activities, lack significant value chains, and are characterized by low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Develop new forms of tourism (gastronomy, agritourism, health, cruise, winter, experiences etc.), extent tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.
2. Protect the environment and cultural, architectural and historical heritage, improving local quality features and services and highlighting quality of life in a strong advantage that is going to attract new residents to the region.
3. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region.
4. Develop the energy sector through investments in renewable projects, such as solar, wind and local energy networks, that are going to reduce energy costs in production and make the region a more attractive investment destination.
5. Support the transformation and diversification of the primary sector towards quality and organic products and development of a new agri-food sector that exports to specialized and high-income markets.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, the Ionian Islands face significant challenges in terms of improving the innovative capacity of their productive sector. Despite the fact that their performance in terms of innovation indicators improved during the last decade, the region has, still, significant room for improving the innovative capacity of its production base. Nevertheless, the current ROP of Ionian Islands allocates a relatively small amount of funds to R&D and innovation actions (approximately 9 million euros), whose implementation, in addition, is experiencing a serious delay.

The presence (and the recent expansion) of the Ionian University in the region indicates that there are, still, unexploited possibilities for the production of relatively high-quality research, which can be the base for knowledge-based local innovative activities. This is a necessary requirement for catching up, as the productive system of Ionian Islands lags behind in terms of innovative capacity compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

The Ionian Islands need to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a fairly -funded and targeted strategy. This major improvement already arises in the relevant scoreboard indicators.

However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

- Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Ionian Islands need to build further on the existing experience of the administration, the University, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
- Address the issue of 'ownership' of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Ionian Islands need to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
- Enhance the business-scientific base collaboration in Ionian Islands, making a better use of the available funds for industrial research and innovation. This can be built upon the experience of these actors in successfully applying to the calls of the SOPs and engaging in the joint implementation of innovative projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, whose potential is not fully exploited, because of the modest progress in the implementation of the Regional Development Program (ROP) and Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects retain a complementary relation with the corresponding ROP's projects.

To enhance the overall performance and impact of the Structural Funds in Ionian Islands, policy intervention should support actions to:

- Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit in full the sub-program for Research and Technology not fully activated by now. It should be noted that stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
- Better focus the ROP financial interventions targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
- Pursue a rebalance in the responsibility over the implementation of the projects funded in the region in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.
- Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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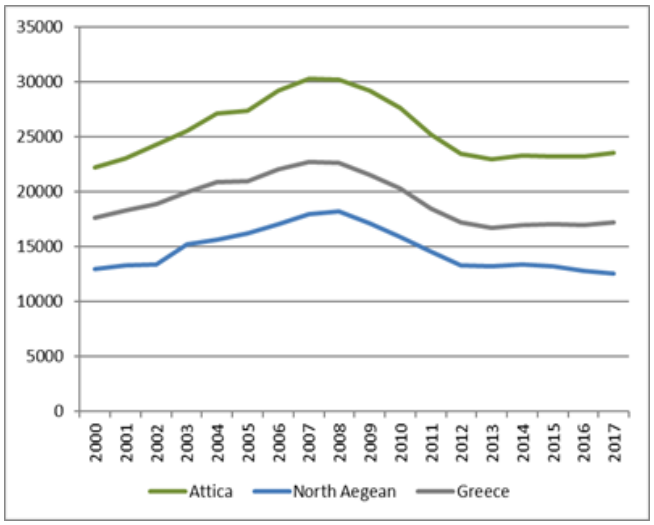
8 North Aegean

Figure 8.1. The location of the region of North Aegean

Figure 8.2. GDP per capita in North Aegean (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

The Region of North Aegean is located in the northeast part of the Aegean Sea, consists only of island areas and has only marine borders with Turkey. Adjacent regions are South Aegean and East Macedonia and Thrace. The city of Mytilene is the capital of the Regional Administration of North Aegean. The region is part of the Decentralized Administration of Aegean Islands. Other major cities of the region of North Aegean are Chios, Neo Karlovasi, Samos, Myrina and Vrontados. The region is divided in five regional units and into 11 municipalities. (Table 8.1).

North Aegean is the second smallest region in Greece with 211,137 inhabitants in 2018, and the second least urbanized. The capital of the Region is Mytilini, which is a major port city and used to be a commercial and industrial hub for the region. The region has experienced a slight population increase in the post-2008 period and a corresponding increasing trend in its population density, which is significantly lower than the national and the EU average. The population of the region lives predominantly in small cities, as the urbanization rate is 47.1%, a value that is below the national average.

Table 8.1. Information on the administrative structure of the region of North Aegean

Regional Administration	A Governor and a Regional Council are elected directly in North Aegean for a 4-year term.
Decentralised administration	North Aegean belongs to the Decentralized Administration of Aegean Islands. The administrative centre of the Decentralized Administration is in Piraeus
Regional units (population)	Lesvos (86,312), Chios (52,477), Samos (33,339), Lemnos (16,992), Icaria (9,774)
Municipalities	The Region of North Aegean has 11 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Mytilini with a population of 27,545 inh. (year 2011).
Other major cities (inhabitants)	Chios (26,361), Neon Karlovasi (6,662), Samos (6,147), Myrina (5,552), Vrontados (5,224) (year 2011)
Regional institutions in South Aegean	University of the Aegean Regional Association of North Aegean Municipalities Lemnos Development Agency S.A Chios Local Development Company S.A Lesvos Local Development Company S.A Samos Employment and Vocational Training Centre S.A.

Sources: ELSTAT (2019) OECD (2019b)

Ageing in North Aegean is an important issue as the share of population over 70 years old is higher compared to the Greek or EU levels and has slightly increased (1%) during the crisis[53]. The elderly dependency ratio was in 2019 at the level of 34.1%, which is near the national average. (Table 8.2). Finally, the index of crude rate of net migration for the region of North Aegean has increased significantly, as the region is the main recipient of migrant and refugee flows.

Table 8.2. Indicators for the population characteristics of the region of North Aegean

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	211,137	*12*	2[a]		0.61	*1*
Population share (%) in the country, 2017	1.9	*13*			5.3	*3*
Population density (inh/km^2), 2018	55.0	*7*	68	47	0.61	*1*
(%) Population >70, 2011	17.3	*3*	117	131	1	*13*
Youth Dependency Ratio[b], 2019	26.21	*1*	119		1.40	*1*
Elderly Dependency Ratio[b], 2019	34.08	*10*	98		-0.14	*13*
(%) Population (25-64 years) with tertiary education[e]	24.2	*9*	78	77	3.4	*9*
Urbanization ratio, 2011	47.1	*12*	62		0.1	*11*
Crude rate of net migration[d], 2017	39.2	*1*			33.2[c]	*1*

Notes: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a).e: period 2001-2011
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

[53] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region includes a large tertiary sector, which has a GDP share equal to 83.7%, which is higher than the national average (106%) as well as the European average (113%). The tertiary sector also has a higher relative productivity comparing to the national and the European average. The primary sector has a GDP (5.4%) and employment (13.1%) share that is well above the national and European average and a relative productivity that is low compared to the two other sectors (0.4), but above that of the national (108%) and European (126%) level. The secondary sector in the region is limited in terms of GDP (10.9%) and employment (11.6%) shares, a figure that is well below the national and European average. Its relative productivity is below the national (72%) and the European (82%) average (Table 8.3).

Table 8.3. Indicators of the regional economy of North Aegean

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	5.4	*10*	131	347	3.7	*6*
(%) Secondary in GDP, 2016	10.9	*12*	64	44	1	*2*
(%) Tertiary in GDP, 2016	83.7	*4*	106	113	-0.3	*9*
(%) Primary in Employment, 2015	13.1	*9*	122	274	-0.6	*8*
(%) Secondary in Employment, 2015	11.6	*12*	89	54	-4.7	*10*
(%) Tertiary in Employment, 2015	75.3	*4*	99	102	1.1	*8*
(%GDP)/(% Employment) Primary, 2016	0.4	*8*	108	126	4.9	*5*
(%GDP)/(% Employment) Secondary, 2016	0.9	*11*	72	82	6.9	*1*
(%GDP/(% Employment) Tertiary, 2016	1.1	*3*	107	110	-1.6	*7*

Sources: OECD (2019a), ELSTAT (2019)

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that North Aegean has developed a strong specialization (with LQ>1.25) in administrative and support services, and a slight lower in construction (LQ = 1.19), financial and insurance activities (LQ = 1.12) and in information and communication (LQ = 1.04) (Table 8.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in agricultural sector (Table 8.4).

At a more disaggregated level (NACE2), the region presents a modestly diversified production base, as it has developed some level of specialization in 11 (out of 38) branches (Table 8.4). Strong or high specialization is detected in wood and wood products and in public administration and defence, while weak to modest specialization in agriculture and fishery, in non-metallic mineral products, in furniture manufacturing, in energy supply, in retail trade of motor vehicles, in retail trade, in transport, storage and

communication, in hotels and restaurants, and in education. The region displays overall specialization in 5 tradable branches.

The region could take advantage of its modestly diverse production base so to develop value chains through local forwards and backwards linkages, especially in the branches with a high degree of specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers.[54] All branches appear to have regional multipliers smaller than one. This implies that an increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

Table 8.4. Sectoral specialisation in the region of North Aegean

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	0.83	*10*		
LQ in mining, energy, electricity, water supply, 2016	0.56	*7*		
LQ in manufacturing, 2016	0.42	*11*		
LQ in construction, 2016	1.19	*2*		
LQ in distr. trade, transport, accom., food serv., 2016	0.96	*5*		
LQ in information and communication, 2016	1.04	*4*		
LQ in financial and insurance activities, 2016	1.12	*3*		
LQ in professional, scientific and technical act., 2016	0.83	*7*		
LQ in administrative and support services, 2016	1.51	*1*		
LQ in other services, 2016	0.84	*10*		
RCA[b] in agricultural sector, 2012	5.5	*1*	3.1	*5*
RCA in resource-intensive sector, 2012	0.0	*13*	65.4	*1*
RCA in labour-intensive sector, 2012	0.2	*10*	19.1	*1*
RCA in scale-intensive sector, 2012	0.03	*12*	-10.7	*11*
RCA in specialized supplier sector, 2012	0.03	*12*	-21.9	*11*
RCA in science-based sector, 2012	0.04	*10*	-8.3	*9*
Diversification of productive base [c], 2011	11 (**0**/*5*)	*4*		
Sectors with regional multiplier effects >1[d], 2011	0(**0**/*0*)	*13*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)/A_r)/(A_(i,R)/A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)/X_r)/(X_(i,R)/X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Source: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

[54] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Regional performances and current trends

North Aegean is generating 1.4% of the National GDP being the smallest regional economy in Greece. Its development level, in GDP per capita terms, is relatively low compared to the national average (75%) and very low compared to the EU average (44%). Both GDP and GDP per capita declined during the last decade by 4.1%, experiencing one of the highest drops in development and welfare levels. The region is experiencing a high unemployment rate (23%) which is dramatically higher than the EU average (329%), and one of the highest in the country (3rd position). Unemployment on average has increased by 17% during the last decade, despite the fact that employment ratio has slightly increased by 0.02%.

The productivity level in North Aegean is relatively low, as it holds the 8th position among the Greek regions and significantly lower compared to EU figure (54%). It has declined in the post-2008 period by 2.7%, which is one of the lowest drops among regions. The region has made some progress towards a more extrovert economy, as regional merchandise exports are equal to 8.1% of GDP and have increased by 11.1%, placing North Aegean in the 7th and 3rd place in the respective figures. Despite improvement, the export to GDP figure is still below the national average (57%) and a quarter of the EU average (25%).

The performance of North Aegean in the European Regional Innovation Scoreboard is relatively low, as its relevant figure is equal to just 53% of the EU average and the region ranks 7th among the Greek regions. However, its performance has improved during the last decade by 2.7%, which is the second-best position among the Greek regions. (Table 8.5).

Table 8.5. Indicators of development, competitiveness and welfare for the region of North Aegean

Indicator	Regional indicator		Comparison			Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	EU=100	OECD	Annual change (%)	National Rank
GDP, 2016 (constant 2010 prices, ml. €)	2,602	13	1a			-4.1	12
GDP per capita, 2016 (€/inh.)	12,998	10	75	50	48%	-4.1	13
GDP share (%) in the country, 2017	1.4	13				-4.5	12
Employment share (%) in the country, 2017	5.5	6				0.7	4
(%) Employment/Population, 2018	42.5	5	102	100		0.02	1
(%) Unemployment, 2018	23	3	117	329	10d	17	1
Productivity (GVA/worker, thousand €), 2017	31.6	8	83.7	54.4c		-2.7	12
Merchandise exports to GDP ratio, 2016	8.1	7	57	25		11.1	3
Regional Innovation Scoreboard, 2017	54.6	7		53		2.7b	2

Notes: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

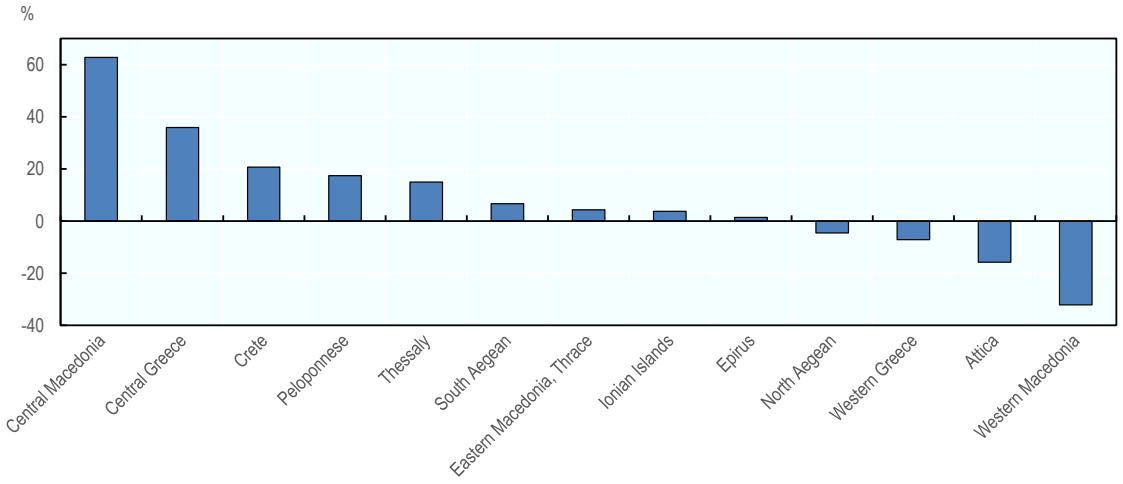
North Aegean is facing acute social problems as more than 13% of the population does not have access to health services, 67.3% of jobless people are long-term unemployed, 26.8% of the young people in the age group 15-24 are excluded from education or the labour market. Moreover, the share of population in danger of poverty and social exclusion is more than 33% (Table 8.6). In most indicators, the region has an inferior performance compared to the national average. Between 2015 and 2017, North Aegean had a negative contribution to national GDP growth of about -4.5% (Figure 8.3).

Table 8.6. Social indicators for the region of North Aegean (2018)

Social indicator (year)	Greece	North Aegean
Share of population with lack of access to health services	8.80	13.3
Long-term unemployment	70.3	67.3
Youth aged 15-24 excluded from education or the labour market	14.1	26.8
Share of people in danger of poverty or social exclusion	31.8	33.6

Source Eurostat (2019b)

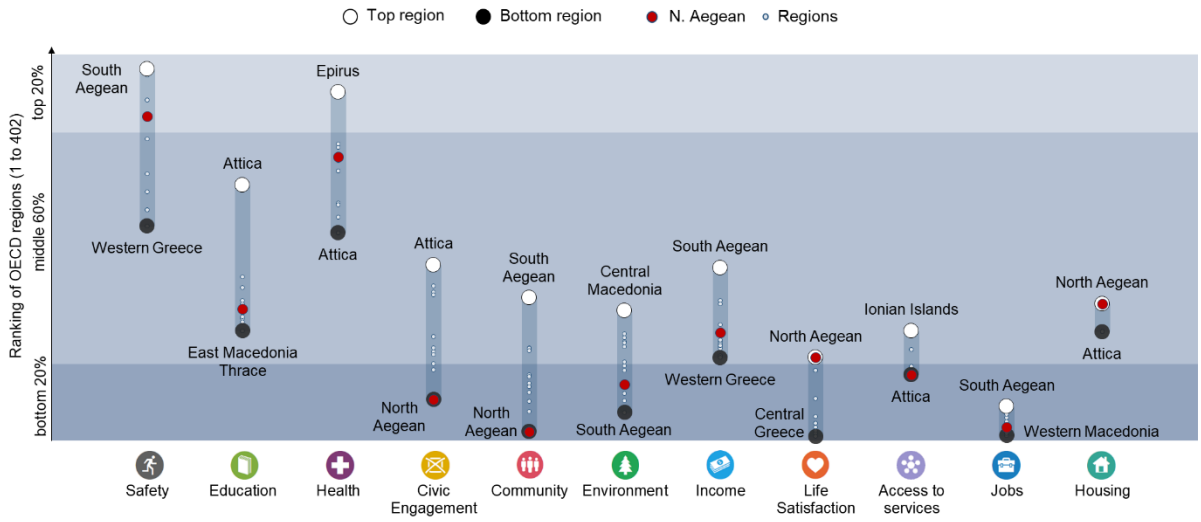
Figure 8.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of North Aegean is varying in a number of well-being indicators estimated by OECD (2019c, Figure 8.4 and Table 8.7). Compared to 402 OECD regions, North Aegean belongs to the middle 60% group in the fields of education, health, income, housing, and life satisfaction. Compared to the other OECD regions, North Aegean has a relatively high score in safety and very low scores in terms of civic engagement, community, environment, access to services and jobs. When compared to the other Greek regions, North Aegean is above the national average in, safety, life satisfaction and housing, close to the national average in health, life expectancy, below the national average in employment, and towards the bottom end of the scale in terms of all other indicators.

Figure 8.4. Regional well-being indicators for North Aegean



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 8.7. Individual well-being indicators outcomes in North Aegean and Greece

	Country Average	OECD median region	North Aegean
Safety			
Homicide Rate (per 100 000 people), 2016	0,8	1,3	0,5
Education			
Labour force with at least upper secondary education (%), 2017	76,7	81,7	69,8
Health			
Life Expectancy at birth (years), 2016	81,5	80,4	82,2
Age adjusted mortality rate (per 1 000 people), 2016	7,5	8,1	7,2
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63,6	70,9	47,3
Community			
Perceived social network support (%), 2013	81,1	91,4	68,8
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18,4	12,4	21,0
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	,,,
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5,6	6,8	6,0
Access to services			
Households with broadband access (%), 2017	65,0	78,0	59,0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53,7	67,7	52,5
Unemployment rate 15 to 64 years old (%), 2017	21,8	5,5	23,1
Housing			
Rooms per person, 2016	1,5	1,8	1,6

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

In the region of North Aegean there are two areas already designed as Allocated Zones of Aquaculture (AZA) that include established PAY zones.[55] The first AZA is located on Lesvos Island prefecture and it has 3 zones for production and 2 for fallow (2 312 411 square meters with a yearly production capacity of 13 806.25 tons of Mediterranean fish species). The Second AZA is located on Chios Island prefecture and includes 4 zones for production and 4 for fallow (8 525 510 square meters with a yearly production capacity of 20 517.50 tons of Mediterranean fish species).

The professional fishing fleet in the North Aegean represents about 13% of the fleet nationwide and includes mainly small coastal fishing vessels and some medium and overseas fishing vessels.

The region hosts three important inter-municipal Municipal Port Funds, in Lesvos, Samos and Chios, which offer facilities for passenger, cruise and cargo traffics. The former is the result of the merge of all the port funds of the island of Lesvos and it is responsible for the ports of Mytilene, Panagiouda, Pamfila, Thermi, Skala Mystegnon, Skala Sykamineas, Mithymna, Petra, Gavatha, Sigri, Skala Eresou, Skala Kallonis, Skala Polihnitou, Plomari, Perama, Dipi, and Kontoroudia. The Inter-Municipal Port Fund of Samos manages a tourist and a commercial/passenger port located in one of the three largest natural gulf in Greece (along with the gulf of Thermaikos and the gulf of Souda) and include such facilities as fishing shelters and equipped boat parking spaces. It also hosts cruise ships and smaller boats transport passengers from Samos to Kusadasi in Turkey. The Inter-Municipal Port Fund of Chios is a management body of 19 port infrastructures and which include one important marina.

SETE, the National Tourism Organisation has estimated in 2019 that coastal tourism in North Aegean has high potential of growth, especially in the sailing & yachting and the cruise sectors.

Enabling Factors

Transport, health and digital infrastructure and environment

Due to the insularity of the region maritime and air transport are the only means of transportation. As a result, the relevant indices are above the National Average. In terms of road density, North Aegean is in the sixth place among Greek regions, but in freight transport, North Aegean is in the last position. There are 5 airports in North Aegean, 4 of them included in the Trans European Transport Network, and also there are 15 commercial ports (in all islands), among them only 1 is in the Trans European Transport

[55] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. PAY are organized in categories, (A), (B) (C), and (D) category of PAY. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

Network. This means that most of the ports are mainly for local transportation and not for international purposes.

Similarly, in terms of health infrastructure, the region holds the eighth position in the country with respect to the number of hospital beds per inhabitant, an indicator that has worsen in the last decade.

Finally, air pollution in North Aegean is modest compared to the other regions (6th place), and additionally presents one of the slowest rates of decline in the country (1st lower negative value) (Table 8.8).

Table 8.8. Indicators of infrastructure for the region of North Aegean

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	32.6	*6*	107		
Commercial airports	5(*4*)[c]	*2*	13[a]		
Passengers in air transport/1000 inh, 2016	5.7	*4*	135	-3.2	*11*
Commercial ports	15(*1*)[c]	*4*	12[a]		
Passengers in maritime transport/1000 inh, 2016	3.9	*6*	133	-7.0	*11*
Road freight transport (thousand tons/inh), 2017	11.0	*13*	24	11.9[b]	*1*
Hospital beds/10,000inh., 2015	31.5	*8*	74.4	-1.3	*6*
Air Pollution in PM2.5 (µg/m³), 2017	16.0	*6*		-1.7	*1*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In North Aegean case, the figures show that R&D-related expenditure is very low, compared to the national average in all the sub-categories and especially in firms in which the region holds one of the lowest positions in the country (Table 8.9). However, the increase in R&D expenditure during the crisis period (apart in the tertiary sector that experienced a decline) is relatively satisfactory in the case of the public sector (1st place) and modest in the case of firms (6th place). In terms of patent applications per million inhabitants, North Aegean does not present any activity.

Table 8.9. Indicators of innovation and development policies for the region of North Aegean

Indicator	Regional indicator		comparison	Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100	Annual change (%)	National Rank
R&D Expenditure (€/inh), 2016	67.4	9	42	0.8 b	12
R&D Expenditure in firms (€/inh), 2016	3.8	11	6	13.3b	6
R&D Expenditure in public sector (€/inh), 2016	22.8	5	56	22.0b	1
R&D Expenditure, tertiary education (€/inh), 2016	40	8	78	-3.4 b	11
Patent applications per million inhabitants, 2015	0	--	0	0	--
Public Investment (€), 2017	54,118,094	12	2a	-4.8	6
Public Investment per capita (€/inh), 2017	265.7	5	95	-5	6
% ESPA allocated to the region	2.8	12			
% National Rural Development Program allocated to the region	4.3	9			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Sources: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020)

Public Investments and European Structural Funds in North Aegean

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is considered an indication of the commitment of the State to regional cohesion and balanced growth. North Aegean receives 2% of the Public Investment national budget against a population share of 1.9% and a GDP share of 1.4%. As a result, the per capita figure is close to the national average (Table 8.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is better aligned to the economic characteristics of the region, as North Aegean receives 5.09% of the amount of ESPA allocated to Regional Operational Programs in Greece and 2.8% of the total amount of ESPA. North Aegean has also received 4.3% of the Rural Development Program (Common Agricultural Policy), a figure that corresponds to the size of the agricultural sector of the region (Table 8.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of North Aegean includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[56] that altogether define the development strategy of the

[56] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in

Region, as defined by the Regional Council in consultation with regional stakeholders. The Vision of the Region of North Aegean is "to reverse the declining development course of the islands of the Region and to pursue real economic and social convergence with the developed regions of the EU through ensuring the conditions for internal and external spatial and social cohesion and preserving the special insular physiognomy of each island".

The Objectives of the Region of North Aegean are the:

- Strengthening of spatial coherence and the upgrade of infrastructure towards the removal of (internal and external) isolation phenomena caused by the insular physiognomy of the Region;
- Enhancement of the attractiveness, competitiveness and extroversion of islands and enterprises, focusing on the use of local products and services available to the islands;
- Social support in addressing the crisis-related phenomena and providing support to vulnerable social groups; and
- The upgrade of the environment and the culture and their accentuation into a local resource that is going to be transformed into a development mechanism.

The Priorities of the Region of North Aegean are to:

- Suspend the decline in productive / entrepreneurial activity and to enhance the competitiveness and the extroversion of enterprises together with the attraction of entrepreneurial investments for the expansion of the entrepreneurial base, with cutting-edge innovation;
- Development, utilization and increase of the participation of human resources into the labour market, the active inclusion and the social embodiment of socially and economically vulnerable population groups;
- Complete and finish sustainable infrastructure for development and employment;
- Protect the environment and the resources and to move towards an environmentally friendly and resource-efficient economy for growth, employment and climate change tackling;
- Improve the institutional adequacy in public administration and to reform public administration towards a more effective regional public administration and self-governance; and
- Enhance the spatial / insular cohesion and development through the removal of the inter- and intra-insular socioeconomic disparities.

The ROP of North Aegean is about 269 million euro, in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than half of these funds are directed to environmental (41.9%) and transport (16.2%) projects or actions, while a big share of resources is devoted to human resources development and protection (28.8%). A relatively smaller amount is available for actions in support of entrepreneurship (6.9%) and for research and technology (4.3%) (Table 8.10).

Compared to the average share of total resources of the 13 ROPs in different policy priorities, the ROP of North Aegean assigns more resources to environment (133%) and less to human capital and social care (78%), research and technology (84%), entrepreneurship (98%) and transport (89%).

The progress in the implementation of the ROP is relatively slow even if catching up over the last year, since about 71.3% of the budget of ROP (by December 2020) has been contracted for projects and actions and 38.2% has been actually spent. The slowest progress in the implementation process in terms of spending is observed in the research and technology (28.5%) and the environment (31.2%) priorities, and

all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

the best (53.6%) in the transport. Considering the average progress, deviation from the overall performance of the ROPs are limited, with the exception of entrepreneurship (better than average) and human capital (slower than average) sub-programs (Table 8.10).

Table 8.10. Indicators for the Regional Operational Programs of the region of North Aegean

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP total budget. (Public expenditure) (€), 2014-2020	269,341,277	*9*	5.09[a]	71.3	*82 (12)*	38.2	*87 (11)*	
% ROP in research and technology	4.3	*7*	95	57.5	*125 (5)*	28.5	*217 (3)*	
% ROP in entrepreneurship	6.9	*7*	85	150.5	*96 (6)*	52.7	*141 (3)*	
% ROP in human capital and social care	28.8	*13*	77	81.4	*78 (13)*	38.3	*67 (13)*	
% ROP in environment	41.9	*1*	136	53.0	*87 (10)*	31.2	*92 (7)*	
% ROP in transport	16.2	*8*	95	73.0	*92 (7)*	53.6	*122 (5)*	
% ROP in technical support	2.0	*8*	97	51.8	*95 (6)*	30.2	*88 (7)*	

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

ESPA Sectoral Operational Programs

The resources of the ROP are matched by a larger amount (about 597 million euros in terms of total public expenditure for funding approved projects to date) allocated to North Aegean by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development).[57] Table 8.11 shows that the SOPs of ESPA directed to North Aegean devote a relatively higher share to entrepreneurship and to human capital and significantly lower resources in research and technology and transport. These programs also reserve some resources for the restructuring and modernization of public administration in North Aegean (2.2%).

[57] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Table 8.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of North Aegean

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-2020	597,396,921.34	*13*	2.35[a]	80.5	*109 (3)*	37.3	*96 (9)*
% ESPA in research and technology	11.4	*4*	115	59.8	*120 (2)*	22.8	*113 (5)*
% ESPA in entrepreneurship	30.3	*4*	115	93.9	*97 (12)*	42.5	*92 (11)*
% ESPA in human capital and social care	24.7	*7*	103	99.4	*107 (5)*	49.4	*98 (7)*
% ESPA in environment	16.8	*12*	67	42.1	*88 (9)*	18.4	*68 (13)*
% ESPA in transport	12.0	*3*	117	81.4	*138 (4)*	38.2	*103 (6)*
% ESPA in administration	2.2	*3*	146	70.2	*98 (7)*	24.8	*73 (12)*
% ESPA in technical support	2.4	*8*	92	88.9	*99 (11)*	54.3	*102 (2)*

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is effectively represented by the combined allocation of funds in both the ROP of North Aegean and the SOPs (considering the funds for North Aegean therein). Table 8.12 shows that significant resources are available in the ROP for human capital and social inclusion (77.5 million euros). Most of these funds are addressing social inclusion actions (58 million euros), and a smaller share is for education and lifelong learning (17 million euros) and actions supporting employment (2.5 million euros). However, as it is shown in Table 8.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 74.7% and payments 32.8% of the budget.

Moving to R&D, North Aegean is characterized by a weak performance as highlighted above. Its R&D expenditure per capita is just 42% of the national average, while its expenditure by firms per capita is 6%

of the national average (Table 8.6). Despite the serious gap, the ROP of North Aegean allocates a relatively small amount to R&D and innovation actions (11.5 million euros), which is activated in a fairly satisfactory level as contracted projects are about 52.3% of the currently allocated funds and 25.9% are paid.

The ROP budget also reserves 18.5 million euros to smart specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is fully contracted, but payments are still low.

Table 8.12. The funds of the ROP of North Aegean for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	77,517,748.00	92,863,016	63,135,982	68.0	29,719,433	32.0
Employment	2,504,191.00	0	0	-	0	-
Education and Lifelong Learning	17,037,500.00	24,919,920	12,363,910	49.6	7,434,959	29.8
Social Inclusion	57,976,057.00	67,943,095	50,772,072	74.7	22,284,474.09	32.8
Innovation	11,500,000.00	12,631,030	6,608,563	52.3	3,272,413	25.9
Research Technology Innovation	5,250,000.00	6,004,112	4,259,449	70.9	2,889,226	48.1
Information and Communication Technologies	6,250,000.00	6,626,918	2,349,113	35.4	383,187	5.8
Smart Specialization	18,500,000.00	27,837,480	27,837,480	100.0	9,740,887	35.0
SME's Competitiveness	18,500,000.00	27,837,480	27,837,480	100.0	9,740,887	35.0

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

In addition to the funds allocated by the ROP, North Aegean receives a larger amount from the Sectoral Programs. Table 8.13 shows that North Aegean receives from the respective SOPs additional 148 million euros for human capital and social inclusion, 181 million euros for Smart Specialization and 68 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and less on social protection, as the later has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is rather satisfactory, as 99.4% of the allocated budget has been contracted and 49.4% spent. In addition, the analysis of the programming and implementation figures that the SOPs devote significant funds on innovation and ICT that have a satisfactory degree of contracting (59.8%), but a low degree of spending (22.8%). Finally, the funds allocated to Smart Specialization are mostly business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is by 94% contracted, but again payments and absorption are still low (42.5%).

Table 8.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to North Aegean

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		147,828,447	146,948,211	99.4	73,081,193	49.4
Employment		65,207,653	46,229,044	70.9	28,281,253	43.4
Education and Lifelong Learning		73,159,022	91,313,690	124.8	36,094,239	49.3
Social Inclusion		9,461,772	9,405,477	99.4	8,705,700.80	92.0
Innovation		68,321,600	40,843,964	59.8	15,558,694	22.8
Research Technology Innovation		24,897,380	5,058,775	20.3	2,388,949	9.6
Information and Communication Technologies		43,424,220	35,785,189	82.4	13,169,745	30.3
Smart Specialization		181,120,144	170,011,262	93.9	76,915,904	42.5
SME's Competitiveness		181,120,144	170,011,262	93.9	76,915,904	42.5

Note: *There is no predefined commitment for each region.
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

The gap between contracting and spending may be explained by a number of factors, which include: (i) the late start of the programs (most of them launched only in 2017); (ii) cumbersome administrative procedures; (iii) the lengthy time that R&D and innovation projects takes to be instructed and implemented; (iv) the weak banking sector, which is reluctant to provides loans or guarantee funds for businesses investment. Eventually, it is worth to consider the main part of the budget in these programs is directed to ICT infrastructure.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, North Aegean is the smallest regional economy in Greece characterized by a low level of development compared to the national and the EU average and a high rate of unemployment. The economy of North Aegean is characterized by the presence of a small primary sector, a weak secondary sector, and a large tertiary sector. The primary sector is, mainly, based on agriculture and fishing and exhibits low levels of relative productivity. The secondary sector is, mainly, based on construction and on labour-intensive industries (such as food), and exhibits low levels of relative productivity. The tertiary sector is based on traditional-type of industries (such as “mass” tourism) and on public administration and defence, and exhibits satisfactory levels of relative productivity. North Aegean has, apparently, the opportunity to improve quality and productivity, as well as local forwards and backwards linkages and competitiveness in sectors of comparative advantage, such as financial and insurance activities, and administrative and support services. This study identifies opportunities in three main areas for North Aegean to improve its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society

3. Enhancing the performance and impact of EU Structural funds

Strengthening and diversifying the productive base of the regional economy

North Aegean specializes in tourism and in construction, and it has a modestly diversified economic base. It lags behind in innovative activities, lacks significant value chains, and is characterized by limited export and low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Develop new forms of tourism (gastronomy, agritourism, health, cruise, winter, experiences etc.), extent tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.
2. Protect the environment and cultural, architectural and historical heritage, improving local quality features and services and highlighting quality of life in a strong advantage that is going to attract new residents to the region.
3. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region.
4. Develop start-ups in the fields of ICTs, bio-food, bio-health, agro-technology, social economy, circular economy or other cutting-edge industries with the support and cooperation of Research Laboratories, Incubators and Entrepreneurship and Innovation Centres.
5. Develop value chains with strong input-output relationships in branches of comparative advantage with the aim of retaining locally most of the added value of the exportable products and services.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, North Aegean faces significant challenges in terms of improving the innovative capacity of its productive sector. Despite the fact that the performance of North Aegean in terms of innovation indicators, marginally, improved during the last decade, the region has, still, significant room for improvement in many aspects. Nevertheless, the current ROP of North Aegean allocates a relatively small amount of funds for R&D and innovation actions (11.5 million euros), whose implementation, in addition, is experiencing a remarkable delay.

The fact that the University of the Aegean appears in the Times Higher Education (Times Higher Education, 2019) global ranking in the 801-1000 ranking category, reflects that there are, still, unexploited possibilities for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of North Aegean is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

North Aegean needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This is a major improvement that already resulted in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

- Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. North Aegean needs to build further on the existing experience of the administration, the University,

the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.

- Address the issue of 'ownership' of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. North Aegean needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
- Enhance the business-science collaboration in North Aegean, making a better use of the available funds for industrial research and innovation. This can be caught-up by building on the experience of these actors (especially the University, but also businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, whose potential is not fully exploited because of the relatively slow progress in the implementation of the Regional Development Program (ROP) and the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOP projects retain a complementary relation with the corresponding ROP projects in the Thematic Objective 3 (enhancing the competitiveness of SMEs) and Thematic Objective 7 (promoting sustainable transport and removing bottlenecks in key network infrastructures), in the sense that they do not cover the same type of actions. In contrast, the centrally-implemented SOP projects are rather competing with the ROP projects in Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), either because the calls run during the same period of time or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in North Aegean, policy intervention should support actions to:

- Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit full steam the sub-program for Research and Technology. Note that regional stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
- Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech sectors, and the development of clusters and value chains of local export-oriented firms.
- Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact, by incorporating in the ROP all place-specific projects and actions implemented in the region.
- Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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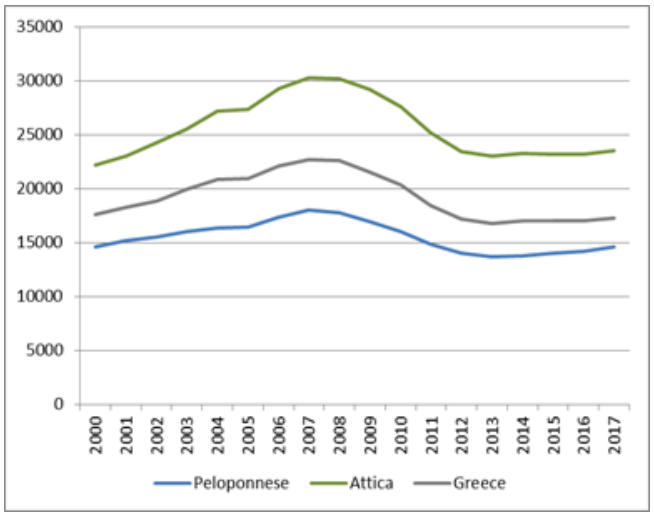
9 Peloponnese

Figure 9.1. The location of the region of Peloponnese

Figure 9.2. GDP per capita in Peloponnese (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

The Region of Peloponnese covers most of the Peloponnese peninsula and borders the Region of Western Greece to the north-west and the Region of Attica to the north-east. On the west coast it is surrounded by the Ionian Sea, whereas on the east coast it is surrounded by the Myrtoan Sea. The city of Tripoli, with about 30,090 inhabitants, is the capital of the Regional Administration of Peloponnese, however Kalamata is the most populated city. The major cities in the region are five: Kalamata, Tripoli, Korinthos, Sparti and Nafplio, which are the centres of the respective regional units. Also, two more cities are over 10,000 inhabitants (Argos and Loutraki). The region is divided into 26 municipalities, covering urban areas and rural areas (Table 9.1).

Peloponnese is the seventh most populated region of Greece with 576,749 inhabitants in 2018, and the tenth most urbanized. Kalamata is the biggest city and constitute a small functional urban area (OECD 2019b). While Kalamata is the most populated city in the region, Tripoli is the capital of the Regional Administration of Peloponnese. The region has experienced a slight population decline in the post-2008 period and a corresponding decreasing trend in its population density.

Table 9.1. Information on the administrative structure of the region of Peloponnese

Regional Self Government	A Governor and a Regional Council are elected directly in Peloponnese for a 4-year term.
Decentralised administration	Peloponnese belongs to the Decentralized Administration of Peloponnese, Western Greece and the Ionian Islands. The capital of the Decentralized Administration is the city of Patra
Regional units (population)	Messinia (161,288), Korinthia (145,059), Argolida (98,554), Arkadia (90,943), Lakonia (89,145)
Municipalities	The Region of Peloponnese has 26 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Tripoli with a population of 30,090 inh. (year 2011)
Other major cities (inhabitants)	Kalamata (53,041), Korinthos (29,993), Argos (22,085), Sparti (16,180), Nafplio (14,671), Loutraki (11,882) Kalamata is a Functional Urban Area (small area) with 70,000 inh.
Regional institutions in Peloponnese	University of Peloponnese Regional Association of Peloponnese Municipalities Development Agency of North Peloponnese S.A (ANVOPE S.A) Development Agency of Parnona S.A (Parnonas S.A) Development Agency of Messinia

Sources: ELSTAT (2019) OECD (2019b)

Ageing in Peloponnese is an important issue as the share of population over 70 years old holds the second position in the country well above the Greek and the EU levels, although it experienced a lower increase (2%) in relation to the other regions58. This is also verified from the elderly dependency ratio which, in 2019, was at the level of 40.2%, which is above the national average. The share of population (25-64 years) with tertiary education is 23%, which is below the national and European average. The share of population that lives in cities is low (51.2%) and quite below the national average. Finally, the index of crude rate of net migration for the region of Peloponnese is positive reflecting an emigration-generated population increase, which, however, is following a declining trend since 2008 (Table 9.2).

Table 9.2. Indicators for the population characteristics of the region of Peloponnese

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	576,749	*7*	5[a]		-0.16	*7*
Population share (%) in the country, 2017	5.4	*7*			1.5	*7*
Population density (inh/km^2), 2018	37.2	*10*	46	32	-0.16	*7*
(%) Population >70, 2011	18.1	*2*	122	137	2.0	*10*
Youth Dependency Ratio[b], 2019	22.1	*9*	98		0.1	*5*
Elderly Dependency Ratio[b], 2019	40.2	*2*	116		1.0	*11*
(%) Population (25-64 years) with tertiary education[e]	23.0	*12*	74	73	3.5	*8*
Urbanization ratio, 2011	51.2	*10*	67		0.3	*7*

58 Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Crude rate of net migration[d], 2017	1.7	*6*			-2.8[c]	*8*

Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.
Notes: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of Peloponnese includes a strong primary sector displaying the highest GDP share in the country (2.2 times as much as the national average and 5.8 times as much as the European average). However, the relative productivity of the primary sector in the region is quite lower when compared to the one of industry and services, and it has the weakest performance compared to the national average, but it is close to the EU average (86% and 101% respectively). The primary sector is based on the development of the agricultural sector, producing mainly olive oil, citrus fruits, vegetables, olives, as well as of the livestock sector producing eggs and milk (Table 9.3).

The region is endowed also with a significant secondary sector displaying a high share in GDP that holds the third place in the national setting and has the highest relative productivity in the country. However, the dynamic presence of industry is due to the industrial activity (mostly crude oil refineries) of the area of Korinthos and in a short distance from Athens, which operates as a 'satellite' activity of the capital region of Attica. Significant is also the role of the coal-based energy producing plant in Megalopolis.

As far as the tertiary sector is concerned, this the largest sector in the region, but its share in GDP is one of the lowest in relation to the other regions. Its relative productivity is slightly higher than the national average and it holds the sixth position in the country (Table 9.3).

Table 9.3. Structural indicators of production in the region of Peloponnese

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	9.1	*3*	221	583	2.5	*8*
(%) Secondary in GDP, 2016	25.5	*3*	150	103	0.6	*4*
(%) Tertiary in GDP, 2016	65.4	*11*	83	88	-0.5	*11*
(%) Primary in Employment, 2015	27.6	*1*	258	580	-1.4	*12*
(%) Secondary in Employment, 2015	12.5	*8*	96	58	-3.0	*3*
(%) Tertiary in Employment, 2015	59.9	*12*	79	81	1.5	*2*
(%GDP)/(% Employment) $_{Primary}$, 2016	0.3	*11*	86	101	4.6	*7*
(%GDP)/(% Employment) $_{Secondary}$, 2016	2.0	*1*	157	178	4.2	*7*
(%GDP/(% Employment) $_{Tertiary}$, 2016	1.1	*6*	106	109	-2.3	*12*

Sources: OECD (2019a), ELSTAT (2019)

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Peloponnese has developed a strong specialization (with LQ>1.25) in manufacturing and agriculture with a lower but still detectable specialization in other services, construction and mining (Table 9.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) only in resource-intensive sectors (Table 9.4).

Peloponnese is characterized by a less diversified production base, as it has developed some level of specialization in 6 (out of 38) NACE2 branches. Strong or high specialization is exhibited in coke and refined petroleum products, and in agriculture while weak to modest specialization in mining and quarrying, repair and installation of machines and equipment, electrical machinery and apparatus, and wood. The region displays overall specialization in 6 tradable branches.

The region could take advantage of its production base in order to develop value chains through local forwards and backwards linkages, especially in branches in which it exhibits some specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers[59]. Only three branches appear to have regional multipliers greater than one, and only one of them is in tradable branches and in branches in which the region exhibits specialization. This implies that in most branches an increase in regional demand does not lead to an equal or higher increase in regional production.

Table 9.4. Sectoral specialisation in the region of Peloponnese

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	1.44	*3*		
LQ in mining, energy, electricity, water supply, 2016	1.12	*2*		
LQ in manufacturing, 2016	1.52	*2*		
LQ in construction, 2016	1.15	*3*		
LQ in distr. trade, transport, accom., food serv., 2016	0.79	*9*		
LQ in information and communication, 2016	0.86	*7*		
LQ in financial and insurance activities, 2016	0.9	*8*		
LQ in professional, scientific and technical act., 2016	0.65	*12*		
LQ in administrative and support services, 2016	0.87	*8*		
LQ in other services, 2016	1.23	*3*		
RCA[b] in agricultural sector, 2012	0.5	*11*	-14.6	*12*
RCA in resource-intensive sector, 2012	1.8	*1*	-5.0	*8*
RCA in labour-intensive sector, 2012	0.0	*12*	-28.5	*12*
RCA in scale-intensive sector, 2012	0.0	*13*	-14.7	*12*
RCA in specialized supplier sector, 2012	0.1	*11*	-12.9	*8*
RCA in science-based sector, 2012	0.1	*9*	-27.1	*13*
Diversification of productive base[c], 2011	6 (**2**/*6*)	*13*		

[59] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Sectors with regional multiplier effects >1[d], 2011	3(**1**/*1*)	*8*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performances and current trends

Peloponnese is generating 4.5% of the National GDP, being the seventh largest regional economy in Greece. Its development level, in GDP per capita terms, is relatively low compared to the national average (83%) and very low compared to the EU average (55%). Both GDP and GDP per capita have declined during the last decade by 2.7% and 2.6% respectively, experiencing one of the smallest drops in welfare levels. The productivity level in Peloponnese is lower compared to the national (84%) and significantly lower compared to EU figure (55%), holding the sixth position among the Greek regions. It has declined in the post-2008 period by 1.3%, which is a modest drop compared to the other regions.

Peloponnese appears as an export-oriented economy, as regional merchandise exports are equal to 42.8% of GDP, holding the first position among the other regions and also have increased by 8.8% annually, exhibiting the fifth better performance in the country. On the other hand, the region has a weak performance in the European Regional Innovation Scoreboard that equals to 47% of the EU average, ranking 12th among the Greek regions. Its performance has declined during the last decade by 0.1%, which is almost the weakest record among the Greek regions (Table 9.5).

Table 9.5. Indicators of development, competitiveness and welfare for the region of Peloponnese

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	OECD=100	Annual change (%)	*National Rank*
GDP, 2016 (constant 2010 prices, ml. €)	8,348	*7*	4[a]			-2.7	*2*
GDP per capita, 2016 (€/inh.)	14,390	*7*	83	55	53	-2.6	*2*
GDP share (%) in the country, 2017	4.5	*7*				8.2	*2*
Employment share (%) in the country, 2017	5.4	*7*				0.7	*5*
(%) Employment/Population 2018	44.8	*4*	107	105		-1.3	*6*
(%) Unemployment, 2018	14.8	*12*	76	211	32[d]	7.3	*11*
Productivity (GVA/worker, thousand €), 2017	32.5	*6*	84	55[c]		-1.3	*5*
Merchandise exports to GDP ratio, 2016	42.8	*1*	302	131		8.8	*5*

Regional Innovation Scoreboard, 2017	48.0	*12*		47		-0.1[b]	*11*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

Peloponnese is experiencing a high unemployment rate (14.8%) that is quite below the national average, but more than double compared to the EU average. Unemployment on average has increased by 7.3% during the last decade, while the employment ratio has declined by 1.3%.

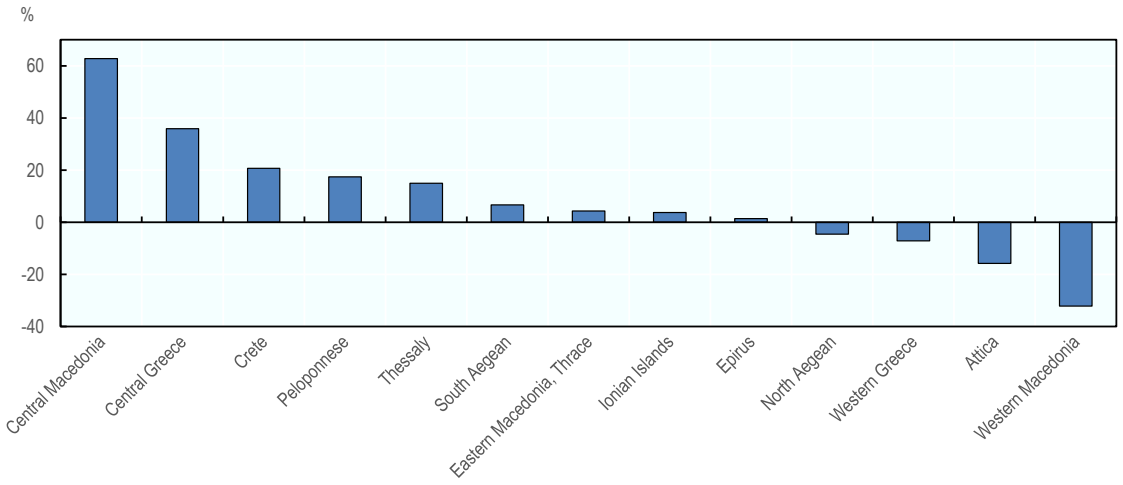
According to the analysis above and the Social Scoreboard indicators published by Eurostat (2019b), Peloponnese is facing serious social problems related to the condition of its human resources (Table 9.6). The figures show that almost 7% of the population of Peloponnese does not have access to health services, and the share of population in danger of poverty and social exclusion is 31%. However, these figures are slightly lower than the national average. An even less favourable picture appears with respect to other social indicators, as 73% of jobless people are long-term unemployed and 18% of the young people in the age group 15-24 are excluded from education or the labour market (Table 9.6). These figures show a more serious problem compared to the national average. Between 2015 and 2017, Peloponnese contributed about 17.4% to the growth of national GDP (Figure 9.3).

Table 9.6. Social indicators for the region of Peloponnese, 2018

Social indicator (year)	Greece	Peloponnese
Share of population with lack of access to health services	8.8	6.9
Long-term unemployment	70.3	73.4
Youth aged 15-24 excluded from education or the labour market	14.1	17.6
Share of people in danger of poverty or social exclusion	31.8	31.4

Source: Eurostat (2019b)

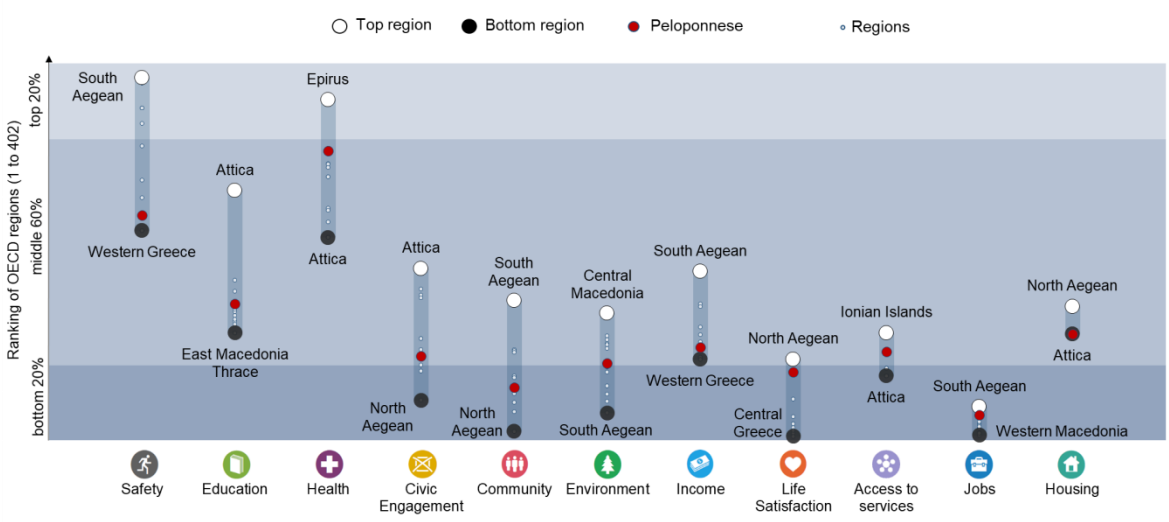
Figure 9.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Peloponnese is varying in a number of well-being indicators estimated by OECD (2019c, figure 9.4 and table 9.7). Compared to 402 OECD regions, Peloponnese belongs to the middle 60% group in the fields of safety, education, health, civic engagement, environment, income, access to services and housing. Compared to the other OECD regions, Peloponnese is having a relatively high score in health and very low scores in terms of education, civic engagement, community, income, access to services and jobs. When compared to the other Greek regions, Peloponnese is above the national average in jobs and access to services, close to the national average in health, community, environment, life satisfaction and housing, below the national average in safety, education, civic engagement and income.

Figure 9.4. Regional well-being indicators for Peloponnese



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 9.7. Individual well-being indicators outcomes in Peloponnese and Greece

	Country Average	OECD median region	Peloponnese
Safety			
Homicide Rate (per 100 000 people), 2016	0.8	1.3	1.0
Education			
Labour force with at least upper secondary education (%), 2017	76.7	81.7	70.9
Health			
Life Expectancy at birth (years), 2016	81.5	80.4	82.3
Age adjusted mortality rate (per 1 000 people), 2016	7.5	8.1	7.0
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63.6	70.9	55.4
Community			
Perceived social network support (%), 2013	81.1	91.4	80.6
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18.4	12.4	18.8
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	11 686
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5.6	6.8	5.9
Access to services			
Households with broadband access (%), 2017	65.0	78.0	67.0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53.7	67.7	55.7
Unemployment rate 15 to 64 years old (%), 2017	21.8	5.5	17.3
Housing			
Rooms per person, 2016	1.5	1.8	1.5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

The region of Peloponnese is included in the European strategy for the Adriatic & Ionian macro-region EUSAIR, which foresees the blue growth and the Blue economy as a strategic pillar of development.

Peloponnese is an important region for aquaculture in Greece and counts several and important PAYs and proposed Allocated Zones for Aquaculture (AZAs),[60] including e.g. Vourlia - Korakias Bay, Plateia Island, Coasts of Arcadia, Trizinia – Methana, Western Saronicos bay.

[60] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect

The professional fishing fleet in the Peloponnese Region represents about 11.5% of the fleet nationwide. According to the National Fisheries Data Collection Program (EPSAD, Final Report 2014 - part B), there were 1 626 professional fishing vessels in Peloponnese in 2014 with capacity of 4 794 GT.

Nafplio is the most important port for cruisers' arrivals (88 ships and 34 704 passengers in 2019). Other ports for cruisers are: Monemvasia (55 and 10 107 passengers in 2019), Gythio (19 arrivals, 9 674 passengers), Kalamata (11 cruisers, 9 288 passengers) and Pylos (9 cruisers, 1 619 passengers). The port of Kalamata has a key geographical location and is the southern end of the Trans-European land roads. It has a modern marina with250 mooring places for boats up to 25 meters. The port of Corinth, located near the Canal offers services for cruise ships . The port also offers Navigation Services, with mandatory Pilot services for crossing the Canal.

Peloponnese is a popular destination for marine and coastal tourism. The most touristic areas are Monemvasia, Nafplio, Leonidio with rock climbing facilities, Galaksidi, Koroni, Pylos and Gialova. The region developed a platform for fishing tourism and it has high potential in diving tourism, given the fact that it hosts the highest number of underwater archaeological sites in Greece.

Enabling Factors

Transport, health digital infrastructure and environment

As the relevant indicators show, transport infrastructure in Peloponnese is modest. In terms of road density and freight transport, the region presents a better picture as it holds the fifth and third position respectively in the country.

On the other hand, in terms of air and port transport, Peloponnese is placed among the last positions in the country. Despite the large number of ports, the region has only one port being part of the comprehensive networks in Europe. However, during the post-2008 period the number of air transport and maritime transport passengers presented the highest increase in the country. In terms of health infrastructure, the region holds the second to last position in the country with respect to the number of hospital beds per inhabitant, while during the crisis period presented one of the highest decreases of this indicator. Finally, air pollution in Peloponnese is in relatively low levels compared to the other regions (9th place) presenting a moderate decline of 2.3% (Table 9.8).

the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

Table 9.8. Indicators of infrastructure for the region of Peloponnese

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	33.2	*5*	109		
Commercial airports	1(*1*)[c]	*10*	3[a]		
Passengers in air transport/1000 inh, 2016	0.4	*10*	10	14.2	*1*
Commercial ports	17(*1*)[c]	*3*	13[a]		
Passengers in maritime transport/1000 inh, 2016	0.5	*11*	19	5.2	*1*
Road freight transport (thousand tons/inh), 2017	69.0	*3*	149	1.8[b]	*7*
Hospital beds/10,000inh., 2015	23.5	*12*	55.5	-3.7	*12*
Air Pollution in PM2.5 (µg/m³), 2017	14.1	*9*		-2.3	*7*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In the case of Peloponnese, the figures show that R&D-related expenditure is very low compared to the national average (12th position). This is attributed largely to the low figures of tertiary education that has a rather weak performance compared to the national average (11th position) and to the weak performance of the private sector (9th position).

Although the private and the public sector have increased considerably their R&D spending during the last decade (taking the first and third place respectively), this is not the case for the higher education sector, which has experienced a significant decline, recording the weakest performance among the 13 regions.

In terms of patent applications per million inhabitants, Peloponnese holds the sixth position in the country, while it also presents the third higher increase during the crisis period (2008-15). This, however, is well below than the national average, indicating a significant gap with the first runner (Attica) (Table 9.9).

Table 9.9. Indicators of innovation and development policies for the region of Peloponnese

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	38.9	*12*	24	-0.8[b]	*13*
R&D Expenditure in firms (€/inh), 2016	6.0	*9*	9	46.0[b]	*1*
R&D Expenditure in public sector (€/inh), 2016	22.2	*6*	55	19.0[b]	*3*
R&D Expenditure, tertiary education (€/inh), 2016	10.1	*11*	20	-11.4[b]	*13*
Patent applications per million inhabitants, 2015	3.9	*6*	41	0.8	*3*
Public Investment (€), 2017	199,506,098	*4*	7[a]	-1.0	*3*
Public Investment per head (€/inh), 2017	344.5	*3*	124	-0.9	*3*
% ESPA allocated in the region	4.3	*9*			
% National Rural Development Program allocated to the region	9.5	*4*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Sources: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020)

Public Investments and European Structural Funds in Peloponnese

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is considered an indication of the commitment of the State to regional cohesion and balanced growth. Peloponnese receives 7% of the Public Investment national budget against a population share of 5.4% and a GDP share of 4.5%. As a result, the per capita figure is higher compared to the national average (Table 9.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics of the region, as Peloponnese receives 4.82% of the amount of ESPA allocated to Regional Operational Programs in Greece and 4.3% of the total amount of ESPA. Peloponnese has also received 9.5% of the Rural Development Program (Common Agricultural Policy), a figure that is the fourth highest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 9.9).

ESPA Regional Operational Program

The Regional Operational Program (ROP) of Peloponnese includes a Vision, 1 Strategic Objective and 10 (out of 11) ESIF Thematic Objectives[61] that altogether define the development strategy of the Region. The development strategy, after a period of open consultation with regional stakeholders, is decided by the Regional Council of Peloponnese, included in the programming documents of the ROP and is finally approved by the European Commission. The Vision of the region of Peloponnese is to "to become a paradigm of sustainable development and social cohesion in Greece and in Europe through the efficient utilization of human and technological capital".

The Objective of the Region of Peloponnese is the "innovative and sustainable self-sustained extroverted growth together with ensuring spatial and social cohesion". The development priorities are:

1. The expansion and upgrading of the research infrastructure of the Peloponnese and the operation of research networks to promote research and innovation, in line with the needs of the region's productive and social cohesion by utilizing ICT.
2. Abatement of the shrinkage of the productive / entrepreneurial activity, the enhancement of the competitiveness and extroversion of firms, and the attractiveness of business investments to expand the business base leading to innovation.
3. The development, exploitation and rise of the participation of human resources in the labour market, and the active integration and social embodiment of socially and economically vulnerable groups.
4. The completion of sustainable infrastructures for growth and employment.
5. The protection of the environment and the resources, and the transition to an environmentally friendly economy with sufficient resources for growth, jobs and climate change.
6. Improvement of institutional capacity in public administration and administrative reforms for effective public administration and self-government authority.
7. Strengthening the spatial cohesion and development, addressing intra-regional socio-economic inequalities.

The Regional Operational Program (ROP) of Peloponnese is about 255 million euro, considering the commitments to date, figure that includes EU funding and national co-funding (public expenditure). Less than half of these funds address environmental (19.4%) and transport (26.6%) projects or actions, while a higher share of resources is devoted to human resources development and protection (42.8%). A smaller amount is available for actions in support of entrepreneurship (5.7%) and for research and technology (3.1%) (Table 9.10).

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Peloponnese assigns more resources to transport (117%), human capital and social care (115%) and entrepreneurship (112%), and less to research and technology (89%) and environment (69%).

The progress of the ROP is being gaining momentum over 2020, since about 91.3% of the budget of ROP (by the beginning of December 2020) has been contracted for projects and actions and about 44.7% has

[61] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

been actually spent. The slowest progress in implementation in terms of spending is observed in the research and development (0.4%) priority, and the best in the transport (72.7%) (Table 9.10).

Table 9.10. Indicators for the Regional Operational Programs of the region of Peloponnese

Indicator	Regional indicator						
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*
ROP total budget. (Public expenditure) (€), 2014-2020	254,905,332	*10*	4.82	91.3	*105 (6)*	44.7	*102 (6)*
% ROP in research and technology	3.1	*11*	69	18.6	*40 (11)*	0.4	*3 (11)*
% ROP in entrepreneurship	5.7	*13*	70	187.1	*120 (3)*	24.5	*66 (11)*
% ROP in human capital and social care	42.8	*3*	115	95.9	*92 (11)*	40.0	*70 (12)*
% ROP in environment	19.4	*13*	63	55.2	*90 (8)*	28.1	*83 (8)*
% ROP in transport	26.6	*2*	156	99.1	*125 (3)*	72.7	*165 (2)*
% ROP in technical support	02.3	*3*	111	81.1	*148 (2)*	59.3	*172 (2)*

Note: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (more than 1 billion euros) allocated to Peloponnese by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[62]. In Table 9.11 we observe that the SOPs of ESPA directed to Peloponnese devote a relatively higher share to environment, and human capital and social care and entrepreneurship, and a lower share in research and technology and transport. These programs also reserve some resources for the restructuring and modernization of public administration in Peloponnese (1.2%).

[62] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Table 9.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Peloponnese

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-2020	1,074,344,498.97	*9*	4.22	69.1	*93 (11)*	34.8	*90 (12)*
% ESPA in research and technology	13.9	*2*	140	65.7	*132 (1)*	23.3	*115 (4)*
% ESPA in entrepreneurship	22.0	*10*	83	92.4	*96 (13)*	46.2	*100 (7)*
% ESPA in human capital and social care	24.5	*8*	102	99.2	*106 (6)*	52.5	*104 (5)*
% ESPA in environment	27.7	*4*	110	32.6	*68 (13)*	19.1	*71 (12)*
% ESPA in transport	8.7	*5*	85	40.2	*68 (10)*	20.2	*54 (10)*
% ESPA in administration	1.2	*9*	76	81.7	*113 (1)*	32.2	*95 (11)*
% ESPA in technical support	2.1	*11*	78	90.5	*101 (5)*	53.7	*101 (6)*

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is well represented by the combined allocation of funds in both the ROP of Peloponnese and the SOPs. Table 9.12 shows that significant resources are available in the ROP for human capital and social inclusion (109 million euros). Most of these funds are addressing social inclusion actions (88 million euros), and a smaller share is for education and lifelong learning (15 million euros) and actions supporting employment (5.2 million euros). However, as it is shown in Table 9.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 73.1% of the budget, although payments is still at 30.1% of the budget.

The ROP budget also reserves 14.6 million euros for smart specialization actions, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of

the region. This action is fully contracted, but payments are still low. In addition to the funds allocated in the ROP, Peloponnese receives a significantly larger amount from the Sectoral Programs in these fields.

Table 9.12. The funds of the ROP of Peloponnese for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	109,116,815.00	142,831,924	104,643,234	73.3	43,680,301	30.6
Employment	5,174,606.00	0	0	-	0	-
Education and Lifelong Learning	15,000,000.00	17,534,933	13,009,746	74.2	5,904,130	33.7
Social Inclusion	88,942,209.00	125,296,991	91,633,488	73.1	37,776,171.10	30.1
Innovation	7,875,000.00	3,834,099	1,466,868	38.3	33,600	0.9
Research Technology Innovation	4,000,000.00	760,368	760,368	100.0	15,000	2.0
Information and Communication Technologies	3,875,000.00	3,073,731	706,500	23.0	18,600	0.6
Smart Specialization	14,553,844.00	27,232,241	27,232,241	100.0	3,567,689	13.1
SME's Competitiveness	14,553,844.00	27,232,241	27,232,241	100.0	3,567,689	13.1

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Table 9.13 shows that Peloponnese receives from the respective SOPs additional 262.8 million euros for Human capital and Social inclusion, 149 million euros for Innovation and 236.9 million euros for Smart Specialization. This means that the regional strategy, as defined in the ROP, gets a strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the later has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is satisfactory, as 99.2% of the allocated budget has been contracted, although only 52.5% has been spent.

In addition, the analysis of the programming and implementation figures show that the SOPs devote significant funds on innovation and ICT that have a satisfactory degree of contracting (65.7%), but a low degree of spending (23.3%).

The gap between contracting and spending is explained by a number of factors. Most common factors are (i) the late start of the programs (most of them launched in 2017), (ii) cumbersome administrative procedures, (iii) but also the actual time that an R&D or innovation project needs in order to be completed. The total amount of funding indicates that innovation policies are mainly supported by the SOPs where the budget is much higher. However, it should be noted that the main part of the budget in these programs is directed to ICT infrastructure.

Finally, the funds allocated to Smart Specialization are mostly business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a relatively significant budget that is by 92.4% contracted, but again payments and absorption are still falling behind. One of the reasons for the slow implementation of the investment projects is the weak banking sector. Most investors face difficulties to get a loan or a guarantee from their banks and as a consequence they have to complete their investment with their own financial means.

The experience from the design and implementation of Structural Funds with respect to skills, innovation and smart specialization indicates that there are some issues to address in policy design and

implementation. First, the fact that the sub-program for Research and Technology in the ROP is not being activated yet, possibly indicates bottlenecks, related to the implementation of the program, that need to be addresed. Although the majority of the stakeholders considers the design of the RIS3 quite satisfactory, it is not implemented in time and according to the plan.

The second issue is related to the level of funding in the ROP. The most important development opportunities in the region are the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, as well the development of clusters and value chains of local export oriented firms. In order to seize these opportunities, investments in R&D and innovation policies are required and a significant part of these policies has to be place-based. According to the findings of the survey, the structural funds would have a greater impact on the regional economy if more emphasis were placed on cooperation between the region's productive and scientific base on innovative actions promoting smart specialization.

Table 9.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Peloponnese

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		262,851,550	260,787,894	99.2	137,954,308	52.5
Employment		127,364,198	100,275,200	78.7	61,377,480	48.2
Education and Lifelong Learning		112,335,187	137,465,441	122.4	55,071,482	49.0
Social Inclusion		23,152,165	23,047,253	99.5	21,505,346.40	92.9
Innovation		148,965,886	97,811,325	65.7	34,641,703	23.3
Research Technology Innovation		18,335,357	9,048,431	49.3	3,112,228	17.0
Information and Communication Technologies		130,630,529	88,762,895	67.9	31,529,475	24.1
Smart Specialization		236,870,008	218,754,897	92.4	109,501,171	46.2
SME's Competitiveness		236,870,008	218,754,897	92.4	109,501,171	46.2

Note: *There is no predefined commitment for each region
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Peloponnese is the 7th largest regional economy in Greece, characterized by a low level of development compared to the national and the EU average and a high rate of unemployment. The economy of Peloponnese includes an important primary sector, a significant secondary sector, and a large tertiary sector. The primary sector is mainly based on agriculture and livestock, and exhibits low levels of relative productivity. The secondary sector is, mainly, based on energy and on labour-intensive industries (such as wood, machinery and equipment, and coke and refined petroleum products), and exhibits high levels of relative productivity. The tertiary sector consists mostly of traditional-type industries (such as “mass” tourism) and exhibits modest levels of relative productivity. The area of Megalopolis faces the challenge to prepare the transition to the post-lignite era, putting emphasis to enrich its economic base with new industrial activities (Box 9.1). Peloponnese as a whole has, apparently, the opportunity to further strengthen the development of the agro-food industry and its relation to the tourism industry.

This study identifies opportunities in three main areas for Peloponnese to seize its decarbonisation process and foster economic development and employment:

1. Strengthening and diversifying the productive base of the regional economy.
2. Pursuing an innovation-oriented and knowledge-intensive regional society.
3. Enhancing the performance and impact of EU Structural Funds.

Box 9.1. The challenge of decarbonisation and the transition to clean energy of Megalopolis

Greece produces high greenhouse gas emissions- 9.2 tons per capita every year, compared to 8.8 tons per capita at EU level. This is mainly due to fossil fuel dependency, with more than 30% of electricity generated from lignite in the two lignite mining areas (the Western Macedonia region and the Megalopolis area in the Peloponnesus region), and close to 10% generated by heavy oil or diesel on the islands.

While 6 out of 11 Greek regions produce 30% or more of their electricity using renewables, Peloponnese, which generate together with Western Macedonia 45% of Greek electricity, still largely rely on coal for electricity generation. In 2017, these two regions used coal-fire power for at least one quarter of their electricity production. In contrast, Central Greece –which is the second largest producer of electricity in the country – has made important progress in the transition to clean electricity. In 2017, 36% of Central Greece's electricity production came from renewable sources.

In its revised National Energy and Climate Plan, the Greek government has committed itself to the full closure of the lignite sector by 2028. To this aim, an Intergovernmental Committee was set up in 2019 to promote the fair transition in the regions in reference. This presents a challenge in terms of transforming the regional economy from its lignite dependency to other economic activities.

In the area of Megalopolis in the central-south part of the Peloponnesus region, where the largest mines and most power plants are located, lignite-based electricity production is by far the most important economic activity. Therefore, while closing down the lignite sector will have positive environmental and health impacts, it poses significant economic and social challenges. An estimated 1,600 jobs are at risk due to the closing of the lignite sector, equally divided between direct and indirect employment. The environmental rehabilitation and repurposing of the mining areas is another important challenge to address, taking into account the "polluter pays" principle.

Sources: OECD Regions and cities at a glance 2020 (country note Greece). European Commission 2020 country reports: Overview of Investments guidance on the Just Transition Fund 2021-27 per member states (Annex D - Greece). Greece's Just Transition Development Plan of lignite areas (18 September 2020).

Strengthening and diversifying the productive base of the regional economy

Peloponnese specializes in agriculture and in energy, and it has a modestly diversified economic base. The region lags behind in innovative activities, lacks significant value chains, and is characterized by low regional multipliers. To tackle these and the transition-related challenges in Megalopolis, priority investment in Peloponnese needs to be targeted at diversifying the regional economy and making it more modern and competitive.

Accordingly, targeted policy interventions should support actions to:

1. Develop new forms of tourism (gastronomy, agritourism, health, cruise, winter, experiences etc.), extension of tourist season and connection with local agriculture, nutrition, scientific base, culture and crafts.

2. Support the transformation and diversification of the primary sector towards quality and organic products and develop a new agro-food sector that exports to specialized and high-income markets.
3. Sustain the regeneration and decontamination of sites, land restoration and repurposing projects;
4. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region.
5. Protect the environment and cultural, architectural and historical heritage, improving local quality features and services and highlighting quality of life in a strong advantage that is going to attract new residents to the region.
6. Support existing industry sectors in which the region already has a comparative advantage and skilled labour (e.g. upskilling and reskilling of workers) to modernize production technology, improve its products and pursue new export markets.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Peloponnese is faced with significant challenges in terms of improving the innovative capacity of its productive sector. The fact that the performance of Peloponnese in terms of innovation indicators has, marginally, declined during the last decade, mainly due to the corresponding decline of the index in tertiary education, indicates that the region has, still, significant room for improvement under many aspects, including the need for R&D to be more business-driven. Nevertheless, the current ROP of Peloponnese allocates a relatively small amount of funds for R&D and innovation actions (approximately 7.9 million euros), whose implementation, in addition, is experiencing a serious delay.

The more active engagement of the University of Peloponnese in applied and locally focused research can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of Peloponnese is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

Peloponnese needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

1. Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Peloponnese needs to build further on the existing experience of the administration, the University, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
2. Address the issue of ‘ownership’ of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Peloponnese needs to better tune the regional Smart Specialization Strategy, in order to implement projects and actions more relevant to the real needs and opportunities in the region.
3. Enhance the science-business collaboration in Peloponnese, making a better use of the available funds for industrial research and innovation. This can be built on the experience of these actors in

successfully applying to the calls of the SOPs and engaging in the joint implementation of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, which potential is not fully exploited because of the modest progress in the implementation of the Regional Development Program (ROP) and to some extend also of the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects retain a complementary relation with the corresponding ROP's projects as regards to Thematic Objective 1 (strengthening research, technological development and innovation), Thematic Objective 3 (enhancing the competitiveness of SMEs), Thematic Objective 5 (promoting climate change adaptation, risk prevention and management), Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), Thematic Objective 8 (promoting sustainable and quality employment and supporting labour mobility), and Thematic Objective 10 (investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure), in the sense that they do not cover the same type of actions. In contrast, the centrally-implemented SOPs' projects retain a rather competing relation with the ROP'S projects as regards Thematic Objective 2 (enhancing access to, and use and quality of, ICT) and Thematic Objective 3 (enhancing the competitiveness of SMEs), either because the calls run during the same period of time or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in Peloponnese, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit the sub-program for Research and Technology in the ROP that basically are not being activated yet. To be noted that some interviewed stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
2. Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.
4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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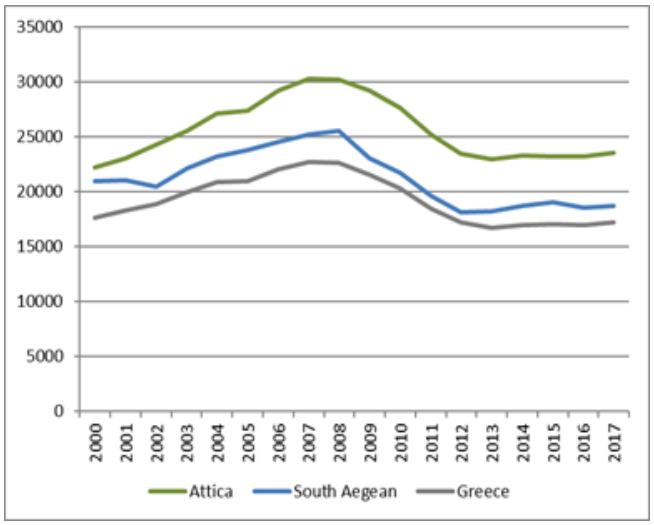
10 South Aegean

Figure 10.1. Location of the region of South Aegean

Figure 10.2. GDP per capita in South Aegean (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

South Aegean is located in the centre of the Aegean Sea and consists only of island areas and has only marine borders with Turkey. Adjacent regions are North Aegean, Crete, Attica and Central Greece. The city of Ermoupoli is the capital of the Regional Administration of South Aegean, however the most populated city is Rodos. The region is part of the Decentralized Administration of Aegean Islands. Other major cities of the region of South Aegean are Kos, Ialysos, Kalymnos, Naxos, Mykonos, Afantou, Ammoudes, Kremasti, Arhangelos, Faliraki. The region includes thirteen regional units, due to the insular character and is divided into 34 municipalities. (Table 10.1).

Table 10.1. Information on the administrative structure of the region of South Aegean

Regional Administration	A Governor and a Regional Council are elected directly in South Aegean for a 4-year term.
Decentralised	South Aegean belongs to the Decentralized Administration of Aegean Islands. The

administration	administrative centre of the Decentralized Administration is in Piraeus
Regional units (population)	Andros (9,128), Kalymnos (29,715), Karpathos (7,818), Kea-Kythnos (3,916), Kos (47,102), Milos (9,788), Mykonos (14, 189), Naxos (21,295), Paros (14, 890), Rodos (152,538), Syros (21,475), Thira (21,187), Tinos (8,699)
Municipalities	The Region of South Aegean has 34 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Ermoupoli with a population of 11,474 inh. (year 2011).
Other major cities (inhabitants)	Rodos (56,175), Kos (25,311), Ialysos (19,288), Kalymnos (11,971), Naxos (7,296), Mykonos (7,101), Afantou (6,837), Ammoudes (6,468), Kremasti (5,743), Arhangelos (5,391), Faliraki (5,261) (year 2011)
Regional institutions in South Aegean	University of the Aegean Regional Association of South Aegean Municipalities Dodecanese Development Agency S.A Cyclades Development Agency S.A

Sources: ELSTAT (2019) OECD (2019b)

South Aegean is the ninth most populated region of Greece with 340,870 inhabitants in 2018, and the sixth most urbanized. The region has experienced a slight population increase in the post-2008 period and a similar trend in its population density, which is lower than the national and the EU average. The population of the region lives predominantly in cities, as the urbanization rate is 62.7%, a value that is, however, below the national average.

Ageing in South Aegean is not such an important issue as the share of population over 70 years old is lower compared to the Greek or EU levels but has increased significantly (3.4%) during the crisis[63]. This is also verified from the elderly dependency ratio which, in 2019, was at the level of 28.2%, which is below the national average (Table 10.2). Finally, the index of crude rate of net migration for the region of South Aegean, is very high and has increased by 2.7%, placing it at the 2nd among Greek regions, which is a reflection of a relatively better economic performance.

Table 10.2. Indicators for the population characteristics of the region of South Aegean

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	EU=100	Annual change (%)	National Rank
Population, 2018	340,870	9	3a		0.34	2
Population share (%) in the country, 2017	3.1	9			5.5	2
Population density (inh/km2), 2018	64.5	5	79	55	0.34	2
(%) Population >70, 2011	11.6	13	78	88	2.4	9
Youth Dependency Ratiob, 2019	25.23	2	112		-0.1	7
Elderly Dependency Ratiob, 2019	28.21	13	81		2.79	2
(%) Population (25-64 years) with tertiary educatione	25.1	6	81	80	8.4	1
Urbanization ratio, 2011	62.7	6	82		0.1	10
Crude rate of net migrationd, 2017	6	2			2.7c	2

Notes: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011.
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

[63] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Regional Economy

Structural characteristics and sectoral specialisations

The economy of the Region of South Aegean is characterized by the relatively small presence of the primary sector in terms of both GDP (2.6% of regional GDP) and employment (7.5% of regional employment) and the corresponding low relative productivity. The presence of the secondary sector is relatively weak in terms of GDP (11.1% of regional GDP) and in terms of employment (14.5% of regional employment), with low level of relative productivity. The presence of the tertiary sector, connected to tourism, is extremely strong in terms of both GDP (86.3% of regional GDP) and employment (78.0% of regional employment), with satisfactory level of relative productivity. (Table 10.3).

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that South Aegean has developed a strong specialization (with LQ 1.86) in distr. trade, transport, accommodation, food services, and a slight lower in construction (LQ 1.15) and professional, scientific and technical activities (LQ 1.03) (Table 10.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in resource-intensive sector (Table 10.4).

At a more disaggregated level (NACE2), the region presents the characteristics of a fragmented island economy. It has a production base with modest diversification, as it has developed some level of specialization in 10 (out of 38) branches. (Table 10.4). It presents strong specialization in mining (marble), wood and tourism and modest to high specialization in water supply. It also presents weak to modest specialization in energy, construction, retail, transport, renting and public administration. The region exhibits overall specialization in 4 tradable branches. The major shift to tourism in the previous decades resulted to the abandonment of traditional sectors like agriculture and fishing which now are limited to few well-known products.

Table 10.3. Indicators of the regional economy of South Aegean

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	2.6	*12*	62	164	1.2	*13*
(%) Secondary in GDP, 2016	11.1	*11*	65	45	0.5	*5*
(%) Tertiary in GDP, 2016	86.3	*2*	109	116	-0.1	*6*
(%) Primary in Employment, 2015	7.5	*12*	70	156	2.8	*1*
(%) Secondary in Employment, 2015	14.5	*3*	111	67	-2.1	*1*
(%) Tertiary in Employment, 2015	78.0	*2*	102	106	0.2	*13*
(%GDP)/(% Employment) Primary, 2016	0.3	*10*	89	105	-1.7	*13*
(%GDP)/(% Employment) Secondary, 2016	0.8	*12*	59	67	3.0	*12*
(%GDP/(% Employment) Tertiary, 2016	1.1	*5*	107	110	-0.3	*1*

Sources: OECD (2019a), ELSTAT (2019)

The region has taken, to some extent, advantage of its strong specialization in tourism to develop a value chains through local forwards and backwards linkages with other branches and has a regional multiplier in tourism greater than one. However, these linkages are weak in most of the other branches and the region is characterized by low regional multipliers.[64] Only 4 branches in the region appear to have a multiplier greater than one, 1 is in tradable branches and 3 in branches in which it exhibits specialization. This is attributed to a large extent to the insular and small size of the island economies and the connectivity problems with each other they face, especially in winter months.

Table 10.4. Sectoral specialisation in the region of South Aegean

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	0.37	*12*		
LQ in mining, energy, electricity, water supply, 2016	0.75	*4*		
LQ in manufacturing, 2016	0.24	*13*		
LQ in construction, 2016	1.15	*3*		
LQ in distr. trade, transport, accom., food serv., 2016	1.86	*1*		
LQ in information and communication, 2016	0.49	*13*		
LQ in financial and insurance activities, 2016	0.7	*11*		
LQ in professional, scientific and technical act., 2016	1.03	*5*		
LQ in administrative and support services, 2016	0.67	*13*		
LQ in other services, 2016	0.87	*9*		
RCA[b] in agricultural sector, 2012	0.3	*13*	-23.5	*13*
RCA in resource-intensive sector, 2012	1.6	*2*	4.8	*5*
RCA in labour-intensive sector, 2012	0.1	*11*	6.5	*5*
RCA in scale-intensive sector, 2012	0.7	*8*	-15.7	*13*
RCA in specialized supplier sector, 2012	0.1	*10*	-22.8	*12*
RCA in science-based sector, 2012	0.2	*6*	-9.8	*11*
Diversification of productive base [c], 2011	10 (**3**/*4*)	*6*		
Sectors with regional multiplier effects >1[d], 2011	4(**3**/*1*)	*5*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)/A_r)/(A_(i,R)/A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)/X_r)/(X_(i,R)/X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

[64] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Regional performances and current trends

South Aegean is generating 3,4% of the National GDP being the 9th largest regional economy in Greece. Its development level, in GDP per capita terms, is relatively high compared to the national average (108%), but relatively low compared to the EU average (72%). Both GDP and GDP per capita have declined during the last decade by 3.5% and 3.7% respectively, experiencing one of the highest drops in welfare levels. The region is experiencing a high unemployment rate (17.3%) which is dramatically higher than the EU average (247%), but one of the lowest in relation to the average national figures (9th position). Unemployment on average has increased by 7.4% during the last decade, while the employment ratio has declined by 0.6%. The productivity level in South Aegean is slightly lower compared to the national average (96.9%) and significantly lower compared to EU figure (62.4%). It has declined in the post-2008 period by 3.0%, which is the lowest drop among regions. In the production sector, the region does not show progress towards a more extrovert economy, as regional merchandise exports are equal to 2.5% of GDP although they have increased by 12.8%, placing South Aegean in the 13th and 2nd place in the respective figures. South Aegean exports as a share of GDP are still far below the national average (18%) and less than 1/10 the EU average (8%). South Aegean has a low performance in the European Regional Innovation Scoreboard, ranking the 11th place among Greek regions and equal to just 47% of the EU average. Moreover, its performance has worsened during the last decade by 0.9%, which is the worst record among the Greek regions. (Table 10.5).

Table 10.5. Indicators of development, competitiveness and welfare for the region of South Aegean

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	EU=100	OECD	Annual change (%)	National Rank
GDP, 2016 (constant 2010 prices, ml. €)	6,338	9	3a			-3.5	7
GDP per capita, 2016 (€/inh.)	18,829	2	108	72	69%	-3.7	11
GDP share (%) in the country, 2017	3.4	9				0.3	8
Employment share (%) in the country, 2017	3.41	9				1.65	2
(%) Employment/Population, 2018	48.3	1	115	114		-0.6	2
(%) Unemployment, 2018	17.3	9	88	247	25d	7.4	9
Productivity (GVA/worker, thousand €), 2017	36.6	4	96.9	62.4c		-3	13
Merchandise exports to GDP ratio, 2016	2.5	13	18	8		12.8	2
Regional Innovation Scoreboard, 2017	54.3	8		47		-0.9b	13

Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).
Notes: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)

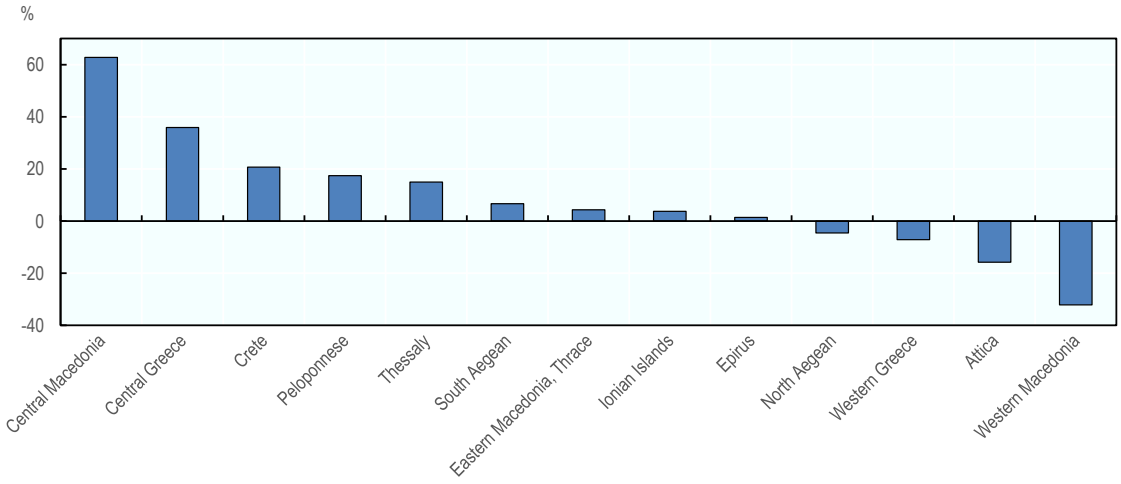
South Aegean is facing considerable social problems as almost 12% of the population of South Aegean does not have access to health services, 32.4% of jobless people are long-term unemployed, and 15.4% of the young people in the age group 15-24 are excluded from education or the labour market. Moreover, the share of population in danger of poverty and social exclusion is more than 35% (Table 10.6). Between 2015 and 2017, South Aegean contributed to the growth of national GDP by about 6.7% (Figure 10.3).

Table 10.6. Social indicators for the region of South Aegean (2018)

Social indicator (year)	Greece	South Aegean
Share of population with lack of access to health services	8.80	12.1
Long-term unemployment	70.3	32.4
Youth aged 15-24 excluded from education or the labour market	14.1	15.4
Share of people in danger of poverty or social exclusion	31.8	35.9

Source: Eurostat (2019b)

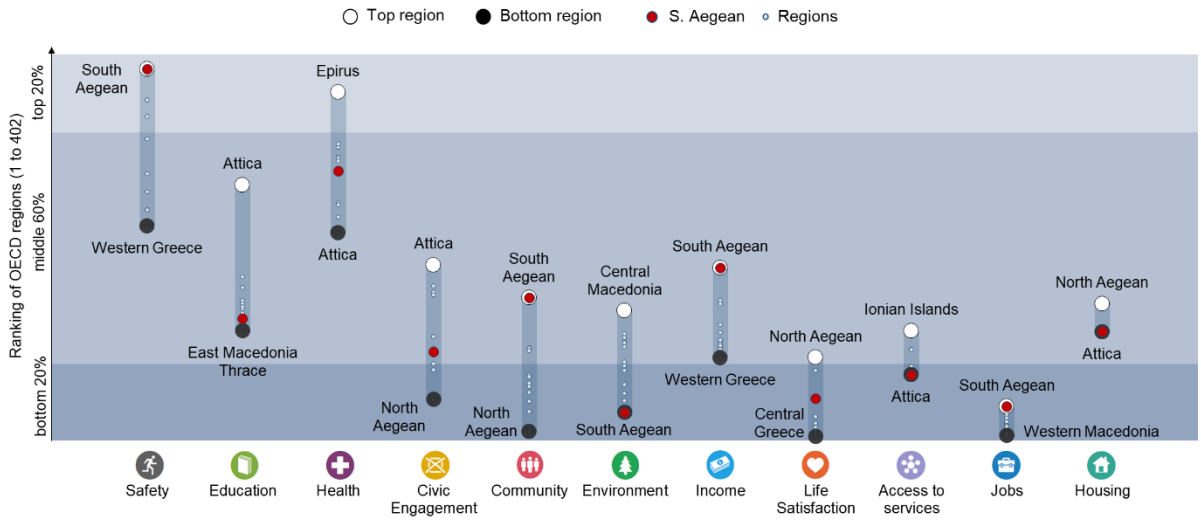
Figure 10.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of South Aegean is varying in a number of well-being indicators estimated by OECD (2019c, Figure 10.4 and Table 10.7). Compared to 402 OECD regions, South Aegean belongs to the middle 60% group in the fields of education, health, civic engagement, community, income and housing. Compared to the other OECD regions, South Aegean has a relatively high score in safety and very low scores in terms of environment, life satisfaction, access to services and jobs. When compared to the other Greek regions, South Aegean is above the national average in employment, income, safety and community, close to the national average in health, life satisfaction, below the national average in civic engagement, and towards the bottom end of the scale in terms of all other indicators.

Figure 10.4. Regional well-being indicators for South Aegean



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 10.7. Individual well-being indicators outcomes in South Aegean and Greece

	Country Average	OECD median region	South Aegean
Safety			
Homicide Rate (per 100 000 people), 2016	0,8	1,3	0,0
Education			
Labour force with at least upper secondary education (%), 2017	76,7	81,7	67,8
Health			
Life Expectancy at birth (years), 2016	81,5	80,4	81,9
Age adjusted mortality rate (per 1 000 people), 2016	7,5	8,1	7,3
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63,6	70,9	56,0
Community			
Perceived social network support (%), 2013	81,1	91,4	89,6
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18,4	12,4	23,7
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	,,,
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5,6	6,8	5,5
Access to services			
Households with broadband access (%), 2017	65,0	78,0	59,0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53,7	67,7	56,6
Unemployment rate 15 to 64 years old (%), 2017	21,8	5,5	16,3
Housing			
Rooms per person, 2016	1,5	1,8	1,5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333,500 people and generates around € 7.2 billion in GVA.

The region of South Aegean includes four areas planned to becoming AZAs (Allocated Zones of Aquaculture), which include established PAY[65] zones, which are already dedicated to the development of aquaculture. The AZA of Leros island will count a total area of 221 624 hectares with a capacity of 15 340 tons of Sea Fish and other pelagic species. The second AZA of Kalymnos island, will include a total area of 355 401 hectares and a total annual capacity of 5 750 tons. The third AZA on Kalymnos island, will include four production zones and three fallow zones with a total area of 102 065 hectares and a total annual capacity of 10 267 tons of salted Mediterranean fish. Finally, the fourth AZA located on Rhodes will have five production zones and one fallow zone with a total area of 284 597 hectares and annual capacity of 14 882 tons.

The professional fishing fleet operating in the South Aegean, according to data from the National Fisheries Data Collection Program (EPSAD, Final Report 2014), consists of 2 040 vessels with a total capacity of 9 513 GT. The fishing fleet consists mainly of old vessels of small capacity and coastal fishing in the South Aegean Region has mainly the form of traditional family activity combined with other activities, while it is practiced mainly by elderly and untrained professional fishermen.

South Aegean counts the Municipal Port Funds of Syros, Thera, Mykonos, South Dodecanese, Kos, Milos, and Patmos, all dealing with of passengers, ships, and cargo. In Syros Island is located one of the few remaining big shipyards of Greece, Neorion Shipyards (ONEX SYROS SHIPYARDS S.A.). The region also include 12 major marinas that can host about 1000 yachts. South Aegean is also one of the most dominant destinations in Greece for Cruising Tourism, islands like Mykonos, Santorini, Rhodes, Patmos, Kos, and Symi are the most visited in Greece by cruise ships.

Coastal and maritime tourism is the major economic activity for the South Aegean Region. According to the Annual Report by the Greek Confederation of tourism (SETE), South Aegean in 2019 counted 29,3% (€ 5 174 800 000) of Greece's total revenues in the sector with an annual number of visitors of about 6 893 400 representing 18.8% of the total visitors in Greece.

[65] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

Enabling Factors

Transport, health and digital infrastructure and environment

The region of South Aegean is not favoured by geography being completely insular, fragmented and distant from mainland Greece (at least half of the islands are more than 10 hours by boat from Piraeus). However, its transport infrastructure, as the relevant indicators show, is above the national average reflecting the special character of the region. In terms of road density, South Aegean is the last place among Greek Regions, although in road freight transport holds the fifth position and is almost on the national average.

On the other hand, in terms of air and port transport, the region is in the first place among Greek Regions. All of the 14 airports and seven out of the 29 ports have a comprehensive position in the Trans European Transport Network, and the passengers indices are by far the highest in Greece. Worth to note that the economic crisis has affected negatively maritime traffic, but airport passengers have increased over the last decade. In terms of health infrastructure, the region holds the tenth position in the country with respect to the number of hospital beds per inhabitant, following a decrease during the crisis period. The problem of hospital beds is even more apparent during the touristic season due to the large number of visitors in South Aegean.

Finally, air pollution in South Aegean is significantly higher compared to the other regions (2nd place), and additionally presents one of the slowest rates of decline in the country (3rd lower negative value) (Table 10.8).

Table 10.8. Indicators of infrastructure for the region of South Aegean

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	19.6	*13*	64		
Commercial airports	14(*14*)[c]	*1*	36[a]		
Passengers in air transport/1000 inh, 2016	30.1	*1*	717	4.9	*4*
Commercial ports	29(*7*)[c]	*1*	23[a]		
Passengers in maritime transport/1000 inh, 2016	23.1	*1*	788	-1.2	*5*
Road freight transport (thousand tons/inh), 2017	45.5	*5*	98	6.2[b]	*3*
Hospital beds/10,000inh., 2015	30.4	*10*	71.8	-3.1	*11*
Air Pollution in PM2.5 (μg/m³), 2017	23.7	*2*		-1.8	*3*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In South Aegean, the figures show that R&D-related expenditure is very low, compared to the national average in all the sub-categories and especially in firms, in which the region holds the last position. Moreover, the increase in the expenditures during the crisis period is very small.

In terms of patent applications per million inhabitants, South Aegean holds the seventh position in the country, which is significantly below the national average indicating a significant gap with the first runner (Attica). Moreover, the index has not improved during the crisis period (2008-15) (Table 10.9).

Table 10.9. Indicators of innovation and development policies for the region of South Aegean

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	Annual change (%)	National Rank
R&D Expenditure (€/inh), 2016	26.8	13	17	0.9b	11
R&D Expenditure in firms (€/inh), 2016	0.1	13	0	-22.1b	13
R&D Expenditure in public sector (€/inh), 2016	16.5	8	41	14.8b	7
R&D Expenditure, tertiary education (€/inh), 2016	8.7	12	17	-6.5 b	12
Patent applications per million inhabitants, 2015	3	7	32	-14.7	9
Public Investment (€), 2017	50,248,548	13	2a	-6.6	12
Public Investment per capita (€/inh), 2017	148.5	12	53	-7.1	12
% ESPA allocated to the region	3.4	10			
% National Rural Development Program allocated to the region	2.5	12			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Sources: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020).

Public Investments and European Structural Funds in South Aegean

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is considered an indication of the commitment of the State to regional cohesion and balanced growth. South Aegean receives 2% of the Public Investment national budget against a population share of 3.1% and a GDP share of 3.4%. As a result, the per capita figure is lower compared to the national average, due to its relatively high level of development (Table 10.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics and the development level of the region, as South Aegean receives 2.93% of the amount of ESPA allocated to Regional Operational Programs in Greece and 3.4% of the total amount of ESPA. South Aegean has also received 2.5% of the Rural Development Program (Common Agricultural Policy), a figure that is the second lowest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 10.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of South Aegean includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[66] that altogether define the development trajectory (strategy) of the Region, as defined by the Regional Council in consultation with regional stakeholders, within the general EU and national priorities. The Vision of the Region of South Aegean is "to become one of the top destinations world-wide for tourism of experience through the adoption of a sustainable development strategy as well as though production differentiation and creation of a destination identity".

The Objectives of the Region of South Aegean are the:

- smart, competitive and diversified regional economy;
- consolidation of sustainable development with the use of modern resource management methods;
- strengthening of regional cohesion in both spatial and economic-social terms, with the diffusion of growth and the removal of isolation; and
- active support for employment and the promotion of social inclusion.

The Priorities of the Region of South Aegean are to:

- enhance competitiveness and innovation;
- enhance sustainable development and resources management;
- improve basic infrastructure;
- promote social inclusion and to develop human resources; and
- enhance regional cohesion.

The Regional Operational Program (ROP) of South Aegean is about 155 million euro, in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). Almost half of these funds are directed to human capital and social care (50.9%) due to the fact that South Aegean is not considered as Objective 1 region in the current programming period. A relatively smaller amount is available for actions in environment (25.6%), in transport (11.8%) in entrepreneurship (6.2%) and for research and technology (3.5%) (Table 10.10).

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of South Aegean assigns more resources to human capital (143%) and less to research and technology (98%), environment (95%), entrepreneurship and transport (61%).

The progress in the implementation of the ROP showed a recovery pace over 2020, since about 99.9% of the budget of ROP (by December 2020) has been contracted for projects and actions and 54.4% actually spent. The slowest progress in the implementation process in terms of spending is observed in the research and development (12.5%), and the best (84.1%) in the entrepreneurship. Considering the progress in absolute terms, the overall performance of the ROP is above the national average, with the exception of research and technology (Table 10.10).

[66] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

Table 10.10. Indicators for the Regional Operational Programs of the region of South Aegean

Indicator	Regional indicator						
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA=100 (rank)*	Share of ROP implemented	*NA=100 (rank)*
ROP total budget. (Public expenditure) (€), 2014-2020	154,847,416	*13*	2.93[a]	99.9	*114 (3)*	54.4	*124 (1)*
% ROP in research and technology	3.5	*10*	78	90.5	*196 (1)*	12.5	*95 (5)*
% ROP in entrepreneurship	6.2	*11*	76	175.3	*112 (5)*	84.1	*225 (1)*
% ROP in human capital and social care	50.9	*2*	136	103.4	*99 (6)*	58.6	*102 (8)*
% ROP in environment	25.6	*9*	83	87.0	*143 (2)*	46.7	*138 (3)*
% ROP in transport	11.8	*11*	69	69.6	*88 (8)*	45.0	*102 (7)*
% ROP in technical support	2.0	*10*	97	138.4	*253 (1)*	82.6	*240 (1)*

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 896 million euros in terms of total public expenditure for funding approved projects to date) allocated to South Aegean by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development)[67]. Table 10.11 shows that the SOPs of ESPA directed to South Aegean devote a relatively higher share to entrepreneurship and environment and significantly lower resources in research and technology, human capital and transport. These programs also reserve some resources for the restructuring and modernization of public administration in South Aegean (less than 1%).

Table 10.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of South Aegean

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA=100 (rank)*	Share of SOP implemented	*NA=100 (rank)*
ESPA budget total (€), 2014-2020	896,197,580.76	*10*	3.52	87.3	*118 (1)*	40.7	*105 (4)*
% ESPA in research and technology	8.6	*8*	87	40.8	*82 (13)*	10.4	*51 (13)*
% ESPA in entrepreneurship	44.6	*1*	169	97.0	*101 (6)*	41.5	*90 (12)*
% ESPA in human capital and social care	14.3	*13*	60	173.5	*186 (1)*	80.9	*160 (1)*
% ESPA in environment	21.8	*8*	87	52.0	*108 (6)*	31.4	*117 (3)*
% ESPA in transport	8.0	*8*	78	25.9	*44 (13)*	19.7	*53 (11)*
% ESPA in administration	0.7	*13*	45	72.7	*101 (5)*	21.7	*64 (13)*
% ESPA in technical support	2.1	*10*	80	89.2	*99 (10)*	53.3	*100 (9)*

Notes: a: the value is the national share of the region.

[67] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Source: Ministry of Development and Investments (3 December 2020)

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is resulting by the combined allocation of funds in both the ROP of South Aegean and the SOPs. Table 10.12 shows that significant resources are available in the ROP for human capital and social inclusion (79 million euros). Most of these funds are addressing social inclusion actions (60.6 million euros), a smaller share is for education and lifelong learning (15 million euros) and actions supporting employment (3 million euros). However, as it is shown in Table 10.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is quite satisfactory, as the contracted share reaches 89.8% and payments 45% of the budget.

Moving to R&D, South Aegean characterizes for a weak performance as highlighted previously. Its R&D expenditure per capita is just 17% of the national average, while its expenditure by firms per capita is almost 0% of the national average. Despite the serious gap, the ROP of South Aegean allocates a relatively small amount to R&D and innovation actions (5.4 million euros), which in addition are not been fully active yet.

The ROP budget also reserves almost 9.6 million euros to Smart Specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is fully contracted, but payments are still relatively low. In addition to the funds allocated in the ROP, South Aegean receives a significantly larger amount from the Sectoral Programs in these fields.

Table 10.12. The funds of the ROP of South Aegean for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	78,814,188.00	97,594,031	81,513,233	83.5	46,198,343	47.3
Employment	3,270,696.00	1,590,560	440,600	27.7	0	0.0
Education and Lifelong Learning	14,985,088.00	23,097,789	15,627,467	67.7	13,305,608	57.6
Social Inclusion	60,558,404.00	72,905,683	65,445,166	89.8	32,892,734.93	45.1
Innovation	5,380,768.00	6,944,024	4,867,895	70.1	672,608	9.7
Research Technology Innovation	3,140,384.00	3,802,303	3,767,508	99.1	556,432	14.6
Information and Communication Technologies	2,240,384.00	3,141,721	1,100,387	35.0	116,176	3.7
Smart Specialization	9,593,262.00	16,813,631	16,813,631	100.0	8,066,327	48.0
SME's Competitiveness	9,593,262.00	16,813,631	16,813,631	100.0	8,066,327	48.0

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

In addition to the funds allocated by the ROP, South Aegean receives a larger amount from the Sectoral Programs. Table 10.13 shows that South Aegean receives from the respective SOPs additional 128 million euros for human capital and social inclusion, 399 million euros for Smart Specialization and 77 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs also. The policy mix in the SOPs is focused only on employment and lifelong learning and not on social protection, as the later has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is pretty satisfactory, as 173% of the allocated budget has been contracted (with substantial overbooking) and 80.9% spent. In addition, the analysis of the programming and implementation reveals that the SOPs devote significant funds on innovation and ICT that have a low degree of contracting (40.8%) and a correspondingly even lower degree of spending (10.4%).

Finally, the funds allocated to Smart Specialization are mostly business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is by 97% contracted, but again payments and absorption are still rather low (41.5%). One of the reasons for the slow implementation of the investment projects is the weak banking sector. Most investors face difficulties to get a loan or a guarantee from their banks, as a consequence they have to complete their investment with their own financial means.

The gap between contracting and spending may be explained by a number of factors, which include: (i) the late start of the programs (most of them launched as late as in 2017); (ii) cumbersome administrative procedures; (iii) the lengthy period that R&D and innovation projects take to be designed and implemented; (iv) the weak banking sector, which is reluctant to provides loans or guarantee funds for businesses investment.

Table 10.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to South Aegean

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		128,127,800	222,281,677	173.5	103,710,320	80.9
Employment		56,748,501	46,720,906	82.3	28,354,850	50.0
Education and Lifelong Learning		45,499,436	149,736,971	329.1	51,299,470	112.7
Social Inclusion		25,879,863	25,823,800	99.8	24,056,000.00	93.0
Innovation		77,064,898	31,438,073	40.8	7,985,360	10.4
Research Technology Innovation		9,253,717	4,049,384	43.8	3,024,000	32.7
Information and Communication Technologies		67,811,181	27,388,689	40.4	4,961,360	7.3
Smart Specialization		399,313,271	387,365,254	97.0	165,896,495	41.5
SME's Competitiveness		399,313,271	387,365,254	97.0	165,896,495	41.5

Note: *There is no predefined commitment for each region
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, South Aegean is the 9th largest regional economy of Greece characterized by a relatively high (low) level of development and a modest (high) rate of unemployment compared to the national (EU) average. The economy of South Aegean includes a small primary sector, a weak secondary sector, and a large tertiary sector. The primary sector is, mainly based on the agriculture and fisheries and exhibits low levels of relative productivity. The secondary sector is, mainly based on labour-intensive industries (such as food, and wood), and exhibits also low levels of relative productivity. The tertiary sector is, mainly based on tourism, and exhibits satisfactory levels of relative productivity. South Aegean has, apparently, the opportunity to link the development of the agro-food industry to the food and the tourism industries. This study identifies opportunities in three main areas for South Aegean to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society
3. Enhancing the performance and impact of EU Structural funds

Strengthening and diversifying the productive base of the regional economy

South Aegean specializes in tourism and in labour-intensive manufacturing, and it has modestly diversified economic base. South Aegean lags behind in innovative activities, lacks significant value chains, and is characterized by limited export and low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Develop new forms of tourism (gastronomy, agritourism, health, cruise, winter, experiences etc.), extent tourist season and connect with local agriculture, nutrition, scientific base, culture and crafts.
2. Protect the environment and cultural, architectural and historical heritage, improving local quality features and services and highlighting quality of life in a strong advantage that is going to attract new residents to the region.
3. Transform local and regional government into an effective mechanism for supporting economic activities and new investment in the region by developing appropriate development and spatial plans as well as appropriate investment licensing policies.
4. Develop start-ups in the fields of ICTs, bio-food, bio-health, agrotechnology, social economy, circular economy or other cutting-edge industries with the support and cooperation of Research Laboratories, Incubators and Entrepreneurship and Innovation Centres.
5. Support the transformation and diversification of the primary sector towards quality and organic products and development of a new agro-food sector that exports to specialized and high-income markets.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, South Aegean faces significant challenges in terms of improving the innovative capacity of its productive sector. The fact that the performance of South Aegean in terms of innovation indicators improved only in the public sector during the last decade, indicates that the region has, still, significant room for improvement in many aspects, e.g. the need to be more business-driven. Nevertheless, the current ROP of South Aegean allocates a relatively small amount of funds for R&D and innovation actions (approximately 5.4 million euros), whose implementation, in addition, is experiencing a delay.

The fact that the University of Aegean appears in the Times Higher Education (Times Higher Education, 2019) global ranking in the 801-1000 ranking category, reflects that there are, still, unexploited possibilities

for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of South Aegean is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

South Aegean needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This is a major improvement that already resulted in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

- Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. South Aegean needs to build further on the existing experience of the administration, the University, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
- Address the issue of 'ownership' of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. South Aegean needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
- Enhance the business-academy collaboration in South Aegean, making a better use of the available funds for industrial research and innovation. This can be caught-up by building on the experience of these actors (especially the University, but also some businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, whose potential is not fully exploited because of the average modest progress in the implementation of the Regional Development Program (ROP) and to some extend also of the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects retain a complementary relation with the corresponding ROP's projects as regards Thematic Objective 3 (enhancing the competitiveness of SMEs) and Thematic Objective 10 (investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure), in the sense that they do not cover the same type of actions. In contrast, the centrally-implemented SOPs' projects retain a competing relation with the ROP's projects as regards Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), either because the calls run during the same period of time or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in South Aegean, policy intervention should support actions to:

- Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit full steam the sub-program for Research and Technology in the ROP that are not being activated yet. To be noted that many interviewed stakeholders consider the design

of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.

- Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
- Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.
- Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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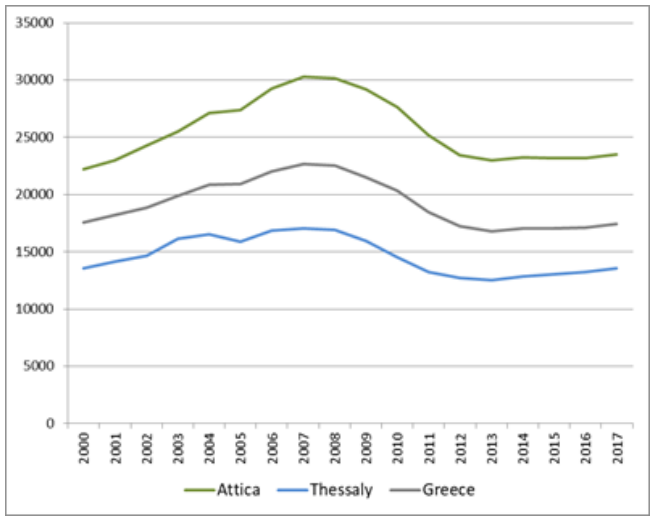
11 Thessaly

Figure 11.1. Location of the region of Thessaly

Figure 11.2. GDP per capita in Thessaly (€, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020.

Local Government, Geography and Demography

Thessaly is located at the centre of the eastern part of the Greek peninsula, between the two main urban agglomerations of Attica and Thessaloniki. The city of Larissa with a population of 144,651 inhabitants (Year 2011) and a Functional Urban Area (FUA) of 200,000 (2015) is the capital of the Regional Administration of Thessaly and the Decentralized Administration of Thessaly – Sterea Ellada. The other major cities in the region are: Volos (144,449 inhabitants), Trikala (61,653) and Karditsa (38,554), which are the centres of the respective regional units. The region is divided into 25 municipalities, covering urban and rural areas, as well as the North Sporades islands (Table 11.1).

Thessaly is the third most populated region of Greece hosting 722,065 inhabitants in 2018 (6.7% of the national population), and the third most urbanized with the higher concentration in the eastern part of the region. Larissa and Volos are the biggest cities and constitute medium-sized functional urban areas (OECD 2019b). While Larissa is the administrative and commercial centre of the region, Volos is a major port city in Greece. The population of the region lives predominantly in cities, as the urbanization rate (67.5%) is below but close to the national average. The region has experienced a slight population decline in the post-

2008 period[68] and a corresponding decreasing trend in its population density (51,4% in 2018), which is significantly lower than the national (63%) but not the EU (44%) average.

Ageing in Thessaly is an important issue as the share of population over 70 years old is significantly higher compared to the Greek or EU levels and has also increased significantly (3.4%) during the crisis[69]. In 2019, the elderly dependency ratio in rural regions close to cities was 40%, close to the value for remote regions (39%) and above intermediate regions (32%). This stands in contrast with 2002 values for OECD rural regions close to cities and remote regions where the elderly dependency ratios were lower (34%). The case of Thessaly, in such a national context, is relevant, since the region with almost 40% holds the third highest elderly ratio in the country and still increasing over the time (Table 11.2).Finally, the rate of net migration for the region of Thessaly is negative, albeit slightly, reflecting the decrease in the population generated by emigration in the area.

Table 11.1. Information on the administrative structure of the region of Thessaly

Regional Administration	The Governor and the Regional Council of Thessaly are elected directly for a 5-year term.
Decentralised administration	Thessaly belongs to the Decentralized Administration of Thessaly – Sterea Ellada. The capital of the Decentralized Administration is the city of Larissa.
Regional units (population)	Larissa (284,325), Magnesia (190,010), Trikala (131,085), Karditsa (113,544), Sporades (13,798).
Municipalities	The Region of Thessaly has 25 Municipalities (out of the 325 Municipalities in Greece) electing directly Mayor and City Council every 4 years.
Regional institutions in Thessaly	University of Thessaly Regional Association of Thessaly Municipalities Pelion Development Company S.A. (EAP) Larissa Prefecture Development Company S.A. (A.E.NO.L. S.A) Trikala Development Agency S.A (KENAKAP S.A) Karditsa Development Agency S.A (AN.KA. S.A)

Note:
Sources: ELSTAT (2019) OECD (2019b)

[68] The decline was much higher in the 2011-18 period (-3.43%)

[69] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Table 11.2. Indicators for the population characteristics of the region of Thessaly

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	722,065	*3*	7 [a]		-0.30	*10*
Population share (%) in the country, 2017	6.7	*3*			0.2	*9*
Population density (inh/km^2), 2018	51.4	*8*	63	44	-0.30	*10*
(%) Population >70, 2011	16.7	*6*	113	126	3.4	*4*
Youth Dependency Ratio[b], 2019	22.49	*5*	100		-0.17	*12*
Elderly Dependency Ratio[b], 2019	39.96	*3*	115	-	0.44	*6*
(%) Population (25-64 years) with tertiary education, 2017	28.6	*4*	92	91	2.6 [b]	*13*
Urbanization ratio, 2011	67.5	*3*	88		0.4	*6*

Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020. Notes: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: period 2001-2011.

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region counts on the presence of a strong primary sector displaying the highest GDP share in the country (about 3 times the national average and more than 7 times the European average). Although the relative productivity of the primary sector in Thessaly is lower when compared to industry and services, it is 1.5 times higher than the national average and 1.8 times than the EU average. The primary sector bases mostly in agriculture and crops and faces significant environmental challenges, such as water shortage, which exert pressure on the existing model of production (Table 11.3).

The region also has a significant secondary sector, which shows a share of GDP and relative productivity above the national average. The industrial activity includes significant sectors such as food, textiles, cement and metals. However, deindustrialization has significantly affected the region since the 1990s. As for the tertiary sector, this is the largest sector in the region, although its share of GDP and relative productivity are low compared to other Greece's regions. Although Thessaly has some important tourism destinations such as still the long seafront area, the Meteora Rocks and the Sporades islands, the region does not show a high specialization in tourism like other Greece's regional economies (Table 11.3).

Table 11.3. Indicators of the regional economy of Thessaly

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*Rank*
(%) Primary in GDP, 2016	11.8	*1*	289	761	4.8	*3*
(%) Secondary in GDP, 2016	19.3	*5*	114	78	-1.3	*11*
(%) Tertiary in GDP, 2016	68.9	*10*	87	93	-0.3	*8*
(%) Primary in Export, 2015	19.9	*4*	186	419	-0.7	*9*
(%) Secondary in Export, 2015	13.9	*4*	106	64	-4.3	*7*
(%) Tertiary in Export, 2015	66.1	*9*	87	90	1.4	*4*
(%GDP)/(%E) Primary, 2016	0.6	*1*	155	182	6.4	*3*
(%GDP)/(%E) Secondary, 2016	1.4	*6*	107	121	3.5	*10*
(%GDP/(%E) Tertiary, 2016	1.0	*9*	101	103	-1.9	*10*

Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013)

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Thessaly has developed a strong specialization (with LQ>1.25) in agriculture and manufacturing, with a lower but still detectable specialization in administrative and support service activities and other services (Table 11.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in agricultural, labour-intensive and scale-intensive sectors (Table 11.4).

Thessaly shows a modestly diversified production base, as it has developed some level of specialization in 11 (out of 38) NACE2 branches (Table 11.4). Strong or high specialization is exhibited in motor vehicles, agriculture (e.g. including livestock and aquaculture), non-metallic minerals and basic metals while weak to modest specialization in food, wood, metal products, furniture, public administration and education. The region displays overall specialization in 8 tradable branches.

The region could take advantage of the limited diversification of its production base to develop local value chains in sectors of specialisation. However, local linkages are weak and the region's prospects for growth are hindered by low regional multipliers.[70] Only two sectors appear to have regional multipliers bigger than one and none of them is in tradable sectors. This implies that in most sectors an increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

[70] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Table 11.4. Sectoral specialisation in the region of Thessaly

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*Rank*
LQ[a] in agriculture, forestry and fishing, 2016	1.7	*1*		
LQ in mining, energy, electricity, water supply, 2016	0.2	*13*		
LQ in manufacturing, 2016	1.4	*3*		
LQ in construction, 2016	1.0	*5*		
LQ in distr. trade, transport, accom., food serv., 2016	0.7	*11*		
LQ in information and communication, 2016	0.6	*9*		
LQ in financial and insurance activities, 2016	0.8	*9*		
LQ in professional, scientific and technical act., 2016	0.7	*11*		
LQ in administrative and support services, 2016	1.2	*4*		
LQ in other services, 2016	1.1	*5*		
RCA[b] in agricultural sector, 2012	2.1	*6*	1.0	*9*
RCA in resource-intensive sector, 2012	0.2	*8*	-5.1	*9*
RCA in labour-intensive sector, 2012	2.5	*3*	12.1	*2*
RCA in scale-intensive sector, 2012	1.8	*2*	10.2	*2*
RCA in specialized supplier sector, 2012	0.4	*8*	-9.9	*6*
RCA in science-based sector, 2012	0.2	*7*	-3.0	*8*
Diversification of productive base [c], 2011	11 (**1**/*8*)	*4*		
Sectors with regional multiplier effects >1[d], 2011	2(**0**/*0*)	*10*		

Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).
Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)/A_r)/(A_(i,R)/A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)/X_r)/(X_(i,R)/X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.

Regional performances and current trends

Thessaly is generating 5.2% of the National GDP being the third largest regional economy in Greece, after Attica and Central Macedonia. However, its GDP per capita is 77% the national average, 46% and 49% the EU and OECD average respectively. Both GDP and GDP per capita have declined during the last decade by -3.1% and -2.8% respectively, experiencing one of the highest drops (4th place) among the Greek regions. The productivity level in Thessaly is 80% the national and 53% the EU average, ranking just 10th out of 13th Greek regions. It has declined in the post-2008 period by -1.1%, which is one of the lowest drops among regions. The region shows progress towards a more export oriented economy, as regional merchandise exports are equal to 13.1% of GDP and have increased by 8.5% annually, placing Thessaly in the 4th and 6th place in the respective figures. Despite the growing exports, these, as a share of GDP, are still below the national average and less than half the EU average. Thessaly has a low performance in the European Regional Innovation Scoreboard, ranking the 8th place among Greek regions and equal to just 53% of the EU average. Its performance has declined during the last decade by -0.5%, which is almost the worst drop among the Greek regions (Table 11.5).

Thessaly is facing acute social problems. Thessaly is facing a high unemployment rate (18.3%) that is close to the national average, higher than the EU average and in the top 10% regions with highest unemployment in OECD in 2016. Unemployment has increased on average by 8.2% per year during the last decade, close to the national mean rate of deterioration, while the employment ratio has declined by

1.5% (Table 11.5). About 9% of the population does not have access to health services, 71% of jobless people are long-term unemployed, 16% of the young people in the age group 15-24 are excluded from education or the labour market, while the share of population in danger of poverty and social exclusion is above 33%. (Table 11.6)

Table 11.5. Indicators of development, competitiveness and welfare for the region of Thessaly

Indicator	Regional indicator		Change in indicator (2008-latest year)		Comparisons		
	Level	*National Rank*	Annual change (%)	*National Rank*	National average = 100 (national share)	EU=100	OECD
GDP, 2016 (constant 2010 prices, ml. €)	9,764	*3*	-3.1	*4*	5 [a]		
GDP per capita, 2016 (€/inh.)	13,418	*9*	-2.8	*4*	77	46	49%
GDP share (%) in the country, 2017	5.2	*3*	4.0	*5*			
Employment share (%) in the country, 2017	6.6	*3*	1.5	*7*			
(%) Employment/Population, 2018	41.1	*8*	-1.5	*8*	98	97	
(%) Unemployment, 2018	18.3	*8*	8.2	*7*	94	261	21[f]
Productivity (GVA/worker, thousand €), 2017	30.8	*10*	-1.1	*4*	80	53[e]	
Merchandise exports to GDP ratio, 2016	13.1	*4*	8.5	*6*	93	40	
Regional Innovation Scoreboard, 2017	54.3	*8*	-0.5 [b]	*12*		53	
Crude rate of net migration [d], 2017	-0.6	*9*	-3.1[c]	*10*			

Notes: a: the value is the national share of the region, b: period 2009-2017, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a), e: for the year 2016, f: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019).

Table 11.6. Social indicators for the region of Thessaly

Social indicator (year)	Greece	Thessaly
Share of population with lack of access to health services (2017)	10.0	8.9
Long-term unemployment (2018)	70.3	71.2
Youth aged 15-24 excluded from education or the labour market	14.1	16.3
Share of people in danger of poverty or social exclusion (2018)	31.8	33.6

Note:
Source: Eurostat (2019a)

Thessaly is the third region in importance in Greece, however concentrates 6 times less employment, 3 times less firms and 20 times less turnover, and has 35 workers less per firm on average compared to Attica (Table 11.7). Despite large differences in economic size, each region in Greece has a potential to

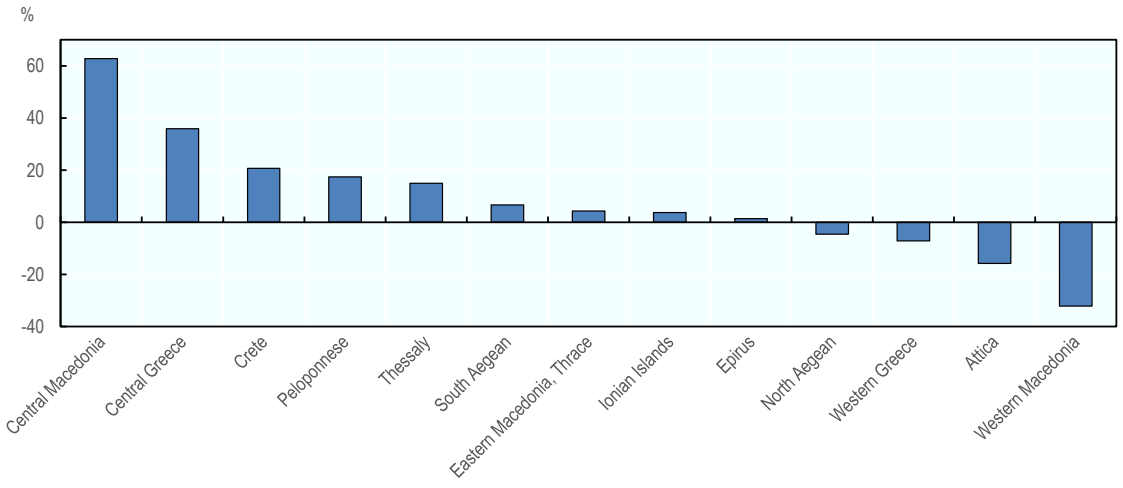
contribute to Greece's economic growth. Between 2015 and 2017, Thessaly contributed to the growth of national GDP for about 20% (Figure 11.3).

Table 11.7. Population, employment, GDP, firms and turnover shares, and average firm size across TL2 regions in Greece, 2019

TL2 region	Population (% national)	GDP (% national)	Employment (% national)	Firms (% national)	Turnover (% national)	Average firm size (employees per firm)
Attica	35	47	36	27	65	47
Central Macedonia	17	14	17	19	11	12
Thessaly	**7**	**5**	**6**	**9**	**3**	**12**
Western Greece	6	5	6	7	3	8
Crete	6	5	6	7	4	7
Eastern Macedonia, Thrace	6	4	6	5	2	11
Peloponnese	5	4	5	5	3	9
Central Greece	5	5	5	5	2	8
Epirus	3	2	3	3	1	29
South Aegean	3	3	3	4	2	7
Western Macedonia	2	2	2	2	1	11
Ionian Islands	2	2	2	3	1	10
North Aegean	2	1	2	3	1	5

Note: % of total national value. Average firm sizes calculated as weighted averages from small region-NAEC 3-digit sector values, with employment used as weight.
Source: Population (2019), GDP (2018) and employment (2018) come from OECD (2020). Regions and Cities database. Accessed on 6 March 2020. Employment and firms come from Hellenic Statistical Authority (2016), Statistical Business register, available at: http://www.statistics.gr/en/statistics/-/publication/SBR01/.

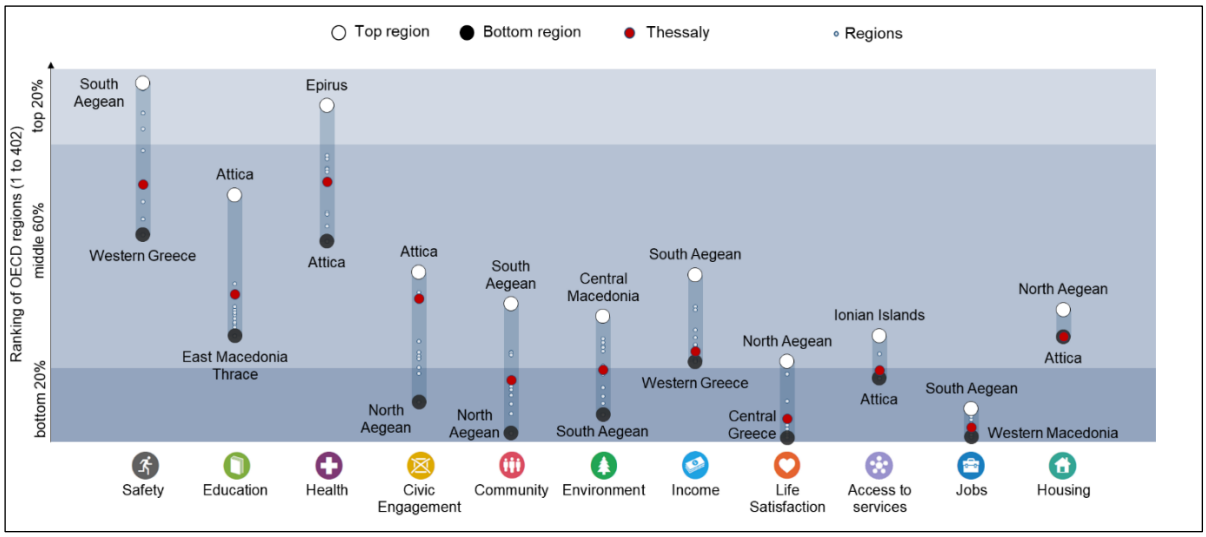
Figure 11.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Thessaly is varying in a number of well-being indicators estimated by OECD (2019c, figures 11.4 and Table 11.8). Compared to 402 OECD regions, Thessaly belongs to the middle 60% group in the fields of safety, health, education, civic engagement, housing and (marginally) income. Compared to the other OECD regions, Thessaly has a relatively high score in safety and health and very low scores in terms of life satisfaction and jobs. When compared to the other Greek regions, Thessaly is above the national average in civic engagement, close to the national average in health, community and environment, below the national average in education and towards the bottom end of the scale in terms of all other indicators.

Figure 11.4. Regional well-being indicators for Thessaly



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 11.8. Individual well-being indicators outcomes in Thessaly and Greece

	Country Average	OECD median region	Thessaly
Safety			
Homicide Rate (per 100 000 people), 2016	0.8	1.3	0.8
Education			
Labour force with at least upper secondary education (%), 2017	76.7	81.7	75.0
Health			
Life Expectancy at birth (years), 2016	81.5	80.4	81.9
Age adjusted mortality rate (per 1 000 people), 2016	7.5	8.1	7.3
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63.6	70.9	65.9
Community			
Perceived social network support (%), 2013	81.1	91.4	81.5
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18.4	12.4	19.0
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	11 661
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5.6	6.8	5.3
Access to services			
Households with broadband access (%), 2017	65.0	78.0	62.0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53.7	67.7	54.0
Unemployment rate 15 to 64 years old (%), 2017	21.8	5.5	21.3
Housing			
Rooms per person, 2016	1.5	1.8	1.5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue Economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

Regarding the aquaculture Sector, in Thessaly there are 13 fish farms in operation, from which only 3 are sea-based. The rest are located on inland fresh water bodies. Considering the number of fish farms nationally (1.068), Thessaly Region represents only the 1,3% of the total units. Moreover, there is no planning for Allocated Zones for Aquaculture (AZAs) in the region and there is only one small PAY[71].

Thessaly counts 1 097 registered professional fishing boats, 7.7% of the total Greek fishing fleet (14 123 boats).

[71] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

The port of Volos, the most significant port of the region, serves both cargo transportation (3th in Greece) and cruise ships (in 2019, 23 077 containers were handled in Volos for about 1 234 426 tons and 22 cruisers with 12 874 tourists arrived in the port).

Coastal Tourism in Thessaly is developed mainly in the north Sporades Islands. The region hosts one of the most important marine parks in Greece, the National Marine Park of Allonissos, situated in North Sporades.

Enabling Factors

Transport, health and digital infrastructure and environment

The region of Thessaly is located at the centre of Greece. However, its favourable geography and location are not exploited since its transport infrastructure, as the relevant indicators show, is below the national average and (in a number of them) among the last places among Greece's regions. In terms of road density and freight transport, Thessaly is behind the metropolitan region of Attica and regions with a nodal geographic position in trans-European networks that therefore have a higher concentration of activities. In terms of air and port transport Thessaly is behind those island regions with a developed touristic industry. Worth to note that the economic crisis has affected negatively both maritime and freight transport. As opposite, in terms of health infrastructure, Thessaly holds the first position in the country with respect to the number of hospital beds per inhabitant, and during the crisis period presented one of the highest increases of this indicator.

Rural regions can benefit by "borrowing" agglomeration benefit from nearby cities if they are well-connected. This includes physical transport connections, but is not limited to them, as for example, digital and ICT connections are crucial. In Thessaly a good practice is given by the city of Trikala which become a "smart city" thank to the city's development company (E-Trikala), which has been instrumental in spurring a culture of digitalisation.

Finally, air pollution in Thessaly is in very low levels compared to the other regions (11th place), but presents one of the slowest rates of decline in the country (12th place).

Table 11.9. Indicators of infrastructure for the region of Thessaly

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*Rank*	National average = 100 (national share)	Annual change (%)	*Rank*
Road network per km^2 (km/100 km^2), 2018	28.5	*9*	93		
Commercial airports	1	*10*	3[a]		
Passengers in air transport/1000 inh, 2016	0.6	*9*	14	5.1	*3*
Commercial ports	5	*9*	4[a]		
Passengers in maritime transport/1000 inh, 2016	1.1	*10*	38	-3.9	*8*
Road freight transport (thousand tons/inh), 2017	34.2	*6*	74	1.9[b]	*6*
Hospital beds/10,000inh., 2015	54.2	*1*	128	0.3	*2*
Air Pollution in PM2.5 (µg/m^3), 2017	13.5	*11*		-2.4	*12*

Note: a: the value is the national share of the region, b: period 2009-2017
Sources: Eurostat (2019), ESPON (2004), OECD (2019a)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also can give a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In the case of Thessaly, the figures show that R&D-related expenditure is very low, compared to the national average. This is significantly due to the local private sector's limited R&D expenditure, having a rather poor performance compared to the national average.

On the other hand, despite the share of population (25-64 years) with tertiary education in the region is below but close to the national and European average (28.6%), Thessaly's expenditure in higher education (University of Thessaly and Technological Institute) is significantly higher than the national average. It is interesting to note that R&D expenditure has increased significantly in Thessaly during the crisis. In terms of patent applications per million inhabitants, Thessaly holds the 5th in the country which, however, is very below than the national average (43% of national average) indicating a significant gap with Attica, which is the front runner region. To be noted that during the crisis (2008-15) Thessaly was 8th in the country.

Table 11.10. Indicators of innovation and development policies for the region of Thessaly

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*Rank*	National average = 100 (national share)	Annual change (%)	*Rank*
R&D Expenditure (€/inh), 2016	76.7	*6*	47	6.0 [b]	*3*
R&D Expenditure in firms (€/inh), 2016	5.5	*10*	8	20.4 [b]	*5*
R&D Expenditure in public sector (€/inh), 2016	19.7	*7*	49	18.6 [b]	*4*
R&D Expenditure, tertiary education (€/inh), 2016	51.4	*5*	100	3.2 [b]	*4*
Patent applications per million inhabitants, 2015	4.1	*5*	43	-12.5	*8*
Public Investment (€), 2017	116,520,942	*7*	4[a]	-5.2	*7*
Public Investment per capita (€/inh), 2017	160.5	*11*	58	-5.1	*8*
% ESPA allocated to the region	6.9	*4*			
% National Rural Development Program allocated to the region	15.3	*2*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Sources: National Documentation Centre (2019), Ministry of Development and Investments (2019b).

Public Investments and European Structural Funds in Thessaly

Public Investment Program

The Public Investment Program (PIP) is the most relevant national policy tools available for Greece's development, supporting infrastructure, entrepreneurship and the development of human resources. Thessaly receives 4% of the PIPs national budget, which is relatively low considering the region's population share of 6.7% and GDP share of 5.2% of the national average.

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics of the region, as Thessaly receives 7.13% of the amount of ESPA allocated to Regional Operational Programs in Greece and 6.9% of the total amount of ESPA. Thessaly has also received 15.3% of the Rural Development Program (Common Agricultural Policy), a figure that is the second highest among the Greek regions and corresponds to the size of the agricultural sector of the region.

ESPA Regional Operational Program

The Regional Operational Program (ROP) of Thessaly includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[72] that altogether define the development trajectory (strategy) of the Region, as defined by the Regional Council in consultation with regional stakeholders, within the general EU and national priorities. The Vision of the region of Thessaly is to become "a strong and innovative economy in Europe, focusing on people and the environment through smart, sustainable and inclusive growth". Thessaly aims to become a 'third' regional growth pole, between Athens and Thessaloniki, leveraging on its comparative advantages in terms of resources, geographical location, urban centres, industrial infrastructure, academic and research infrastructure and skilled human resources.

The strategic Objectives of the ROP are:

1. Halting the decline of the economy and enhancing the attractiveness and competitiveness of the region in order to improve the business environment and the openness of the regional economy.
2. Development, utilization and increase of the labour force participation in the labour market and active inclusion and social inclusion.
3. Developing and networking the region's research system and linking it to the productive / business environment and the public administration of the region.
4. Completion - integration of sustainable and safe use of transport infrastructure for growth and employment.
5. Protecting the environment and resources and moving towards an environmentally friendly economy to tackle climate change and resource efficiency.
6. Implementation of spatial development programs for increasing employability and tackling phenomena of social exclusion in the context of the territorial cohesion of Thessaly.

The Regional Operational Program (ROP) of Thessaly counts about 377 million euro, in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). Slightly less than half of these funds are addressing environmental (22.9%) and transport (26.1%) projects or actions, while the highest share of resources is devoted to human resources development and protection (33.3%). A relatively smaller amount is available for actions in support of entrepreneurship (12.6%) and for research and technology (2.8%).

[72] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Thessaly assigns more resources to entrepreneurship (125%) and transport (131%) and less to human capital and social care (89%), research and technology and environment (93%).

At early December 2020 about 94.9% of the ROP total budget was committed for projects and actions and about 39.9% was actually spent. This performance was close to the national average. The lowest performance in terms of spending in the implementation of Thessaly's ROP process is observed in research and technology (no expenditure) and environment (27.6%) priorities, while the best in human capital and social care (61.4%). Despite the relatively poor performance, deviation from the overall performance of the ROPs are limited, with the exception of research and technology and environment sub-programs.

Table 11.11. Indicators for the Regional Operational Programs of the region of Thessaly

Indicator	Regional indicator						
	Level of Commitments (Public expenditure)	*Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*
ROP total budget. (Public expenditure) (€), 2014-2020	376,696,492	*6*	7.13[a]	94.9	*109 (5)*	39.9	*91 (10)*
% ROP in research and technology b	2.8	*13*	62	0.0	*0 (12)*	0.0	*0 (12)*
% ROP in entrepreneurship	12.6	*1*	155	221.1	*142 (2)*	27.6	*74 (9)*
% ROP in human capital and social care	33.3	*8*	89	95.0	*91 (12)*	61.4	*107 (6)*
% ROP in environment	22.9	*11*	74	55.6	*91 (7)*	20.3	*60 (12)*
% ROP in transport	26.1	*3*	153	82.2	*104 (6)*	40.9	*93 (8)*
% ROP in technical support	2.3	*1*	113	50.9	*93 (7)*	29.7	*86 (8)*

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020).

ESPA Sectoral Operational Programs

The resources of the ROP are matched by an even larger funds (about 1.75 billion euros) allocated to Thessaly by the ESPA Sectoral Operational Programs (SOPs). In the current 2014-20 programming period the SOPs are managed by the Ministry of Development and Investment (former Ministry of Economy and Development)[73]. Table 11.12 shows that the SOPs of ESPA directed to Thessaly devote a relatively higher share to human capital, more or less similar shares to entrepreneurship and environment and significantly lower resources to research and technology and transport. These programs reserve also some resources for the restructuring and modernization of public administration in Thessaly (2.1%).

[73] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Table 11.12. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Thessaly

Indicator	Regional indicator							
	Allocated budget for funding approved projects (public expenditure)	*Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*	
ESPA budget total (€), 2014-2020	1,751,602,263.01	*4*	6.88[a]	65.9	*89 (12)*	36.9	*95 (10)*	
% ESPA in research and technology	9.0	*7*	91	42.5	*86 (11)*	21.2	*105 (8)*	
% ESPA in entrepreneurship	24.7	*7*	94	97.7	*101 (5)*	48.1	*104 (5)*	
% ESPA in human capital and social care	28.4	*2*	118	67.0	*72 (11)*	41.1	*81 (11)*	
% ESPA in environment	23.3	*6*	93	48.3	*100 (7)*	28.3	*105 (5)*	
% ESPA in transport	8.6	*6*	83	30.8	*52 (12)*	22.0	*59 (9)*	
% ESPA in administration	2.1	*4*	137	68.0	*95 (12)*	38.4	*113 (3)*	
% ESPA in technical support	3.9	*2*	145	91.3	*102 (1)*	53.5	*101 (8)*	

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

To deal with these problems Thessaly benefits of a combined action from both its ROP and the relevant SOPs (considering the quota of national funds allocated to Thessaly). Table 11.13 shows that significant resources are available in the ROP for human capital and social inclusion (125 million euros). Most of these funds are addressing social inclusion actions (100 million euros), a smaller share is for education and lifelong learning (18 million euros) and actions supporting employment (7 million euros). However, as it is shown in Table 11.14, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the severity of problems brought by the financial crisis. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 79.4% and payments 50.2% of the budget.

Table 11.13. The funds of the ROP of Thessaly for Skills, Innovation and Smart Specialization

	Committed Public Funds	Allocated Budget	Contracted	Contracted share of budget	Payments	Payments as a share of Budget
Skills	125,475,410.00	149,491,391	119,148,801	79.7	77,039,263	51.5
Employment	7,034,022.00	0	0	-	0	-
Education and Lifelong Learning	18,150,000.00	18,834,805	15,368,562	81.6	11,407,254	60.6
Social Inclusion	100,291,388.00	130,656,587	103,780,239	79.4	65,632,008.51	50.2
Innovation	10,491,835.00	0	0	-	0	-
Research Technology Innovation	7,366,835.00	0	0	-	0	-
Information and Communication Technologies	3,125,000.00	0	0	-	0	-
Smart Specialization	47,500,000.00	105,023,635	105,023,635	100.0	13,088,670	12.5
SME's Competitiveness	47,500,000.00	105,023,635	105,023,635	100.0	13,088,670	12.5

Source: Ministry of Development and Investments (3 December 2020)

As far as innovation and Smart Specialisation is concerned, the ROP budget reserves 47.5 million euros to it (see Table 11.13), an amount that mainly addresses support investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. The financial allocation for this action is fully committed, whereas actual expenditures are still low (12.5%).

In addition to the funds allocated by the ROP, Thessaly receives a significantly larger amount from the Sectoral Programs. Table 11.14 shows that Thessaly receives from the respective SOPs additional 497 million euros for human capital and social inclusion, 433 million euros for Smart Specialization and 158 million euros for Innovation. Hence, the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the later has been implemented by the ROP at the regional and local level. Implementation of the sectoral skills programs is relatively satisfactory, as 67% of the allocated budget has been committed and more than 41% spent. The SOPs also devote a significant amount of funds to innovation and ICT development. In this case, while the level of funds committed so far is somehow satisfactory (42.5%), the actual spending from the programs is much lower (21.2%).

Table 11.14. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Thessaly

	Committed Public Funds*	Allocated Budget	Contracted	Contracted as a share of allocated Budget	Payments	Payments as a share of allocated Budget
Skills		497,282,724	333,019,376	67.0	204,496,439	41.1
Employment		262,324,710	186,527,299	71.1	121,239,510	46.2
Education and Lifelong Learning		208,862,090	120,780,514	57.8	59,454,254	28.5
Social Inclusion		26,095,925	25,711,563	98.5	23,802,674.24	91.2
Innovation		157,568,335	66,896,384	42.5	33,331,129	21.2
Research Technology Innovation		46,589,665	24,635,880	52.9	10,865,342	23.3
Information and Communication Technologies		110,978,670	42,260,504	38.1	22,465,787	20.2

Smart Specialization		433,438,391	423,260,253	97.7	208,533,215	48.1
SME's Competitiveness		433,438,391	423,260,253	97.7	208,533,215	48.1

Note: *There is no predefined commitment for each region.
Source: Ministry of Development and Investments (3 December 2020)

The gap between contracting and spending may be explained by a number of factors, which include: (i) the late start of the programs (most of them launched only in 2017); (ii) cumbersome administrative procedures; (iii) the lengthy time that R&D and innovation projects takes to be instructed and implemented; (iv) the weak banking sector, which is reluctant to provides loans or guarantee funds for businesses investment.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Thessaly is the third largest regional economy of Greece characterized by a low level of development compared to the national and the EU average and a high rate of unemployment. Thessaly is a rural region (OECD) with a good manufacturing base, local services and primary activities, including livestock and aquaculture, food processing and potential for innovation in the agro-food industry. It also has a growing presence in tourism with opportunities to link the development of the food sector to tourism. This study identifies opportunities in three main areas for Thessaly to seize its development path and foster employment:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society
3. Enhancing the performance and impact of EU Structural funds

Strengthening and diversifying the productive base of the regional economy

The region specializes in agriculture and manufacturing, it has a modestly diversified economic base, it lags behind in innovative activities, lacks significant value chains and it is characterized by limited export and low regional multipliers.

Accordingly, targeted policy intervention should support actions to:

- Support the transformation and diversification of the primary sector towards quality and organic products and development of a new agro-food sector that exports to specialized and higher-income markets.
- Strengthen demand driven farm advisory and extension services, and modernising producers groups and cooperative enterprises. Support the development of dedicated services to SMES and start-ups in the fields of ICTs, bio-food, bio-health, agro-technology.
- Connect tourism to local value chains by fostering integrated approaches to tourism thematic product development and marketing, promoting vertical production processes to enhance the delivery of high added value certified food products, developing an all-year-round supply chain networks and developing a comprehensive agro-tourism policy.
- Develop a regional strategy to retain youth and talents.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Thessaly is faced with significant challenges in terms of improving the innovative capacity of its productive sector. Despite the performance of Thessaly in terms of innovation indicators improved during the last decade, the regional innovation system has big margin for improvement under many aspects, e.g.

the need to be more business-driven. Nevertheless, the current ROP of Thessaly allocates a relatively small amount of funds for R&D and innovation actions (10.5 million euros), whose implementation in addition, is experiencing a serious delay.

The fact that the University of Thessaly appears in the Times Higher Education (Times Higher Education, 2019) global ranking in the 600+ position reflects the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of Thessaly is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC 2019).

Thessaly needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is a well-funded and well-targeted strategy. This is a major improvement that already resulted in the relevant scoreboard indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

- Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Thessaly needs to build further on the existing experience of the administration, the University, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
- Address the issue of ‘ownership’ of the RIS3 and at the same time handle the implementation of the R&D programs in a way enabling the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Thessaly needs to better tune the regional Smart Specialisation Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region
- Enhance the business-academy collaboration in Thessaly, making a better use of the available funds for industrial research and innovation. This can be caught up by building on the experience of these actors (especially the University, but also a some businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, whose potential is not fully exploited because of the average constrained progress in the implementation of the Regional Development Program (ROP) and to some extent also of the Sectoral Operational Programs (SOPs). The coexistence of SOP) and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of the most appropriate level of administration for each type of intervention. In general, the centrally implemented programs on research, technology and education complement positively the corresponding actions of the ROP, in the sense that they do not cover the same type of actions. On the other hand, the SOP addressing competitiveness of SMEs and agriculture are often competing and overlapping with the corresponding priorities in the ROP, either because the calls run during the same period of time, or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in Thessaly, policy intervention should support actions to:

- Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit full steam the sub-program for Research and Technology in the ROP that are not being activated yet. To be noted that many interviewed stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and businesses need.
- Better focus the ROP financial intervention targeting support to the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, as well the development of clusters and value chains of local export oriented firms.
- Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.
- Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan

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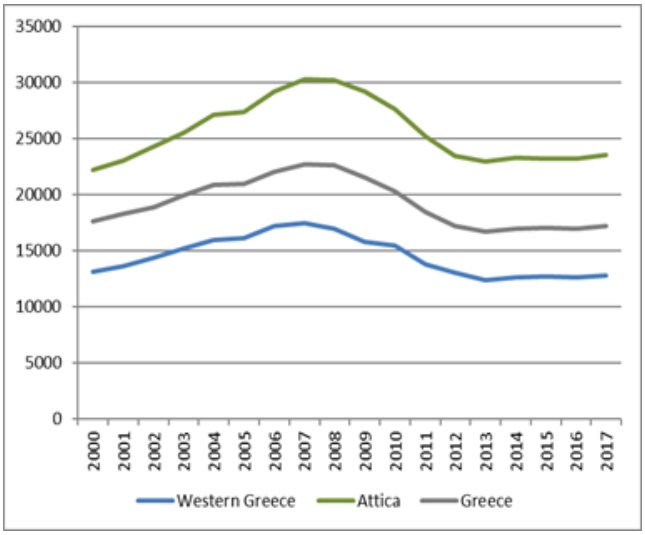
12 Western Greece

Figure 12.1. Location of the region of Western Greece

Figure 12.2. GDP per capita in Western Greece (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

The Region of Western Greece is located in the western part of mainland Greece and has no land borders to other countries. It borders with Peloponnese, Central Greece, and is adjacent to the Region of Ionian Islands. The city of Patra is the capital of the Regional Administration of Western Greece. The region is part of the Decentralized Administration of Peloponnese, Western Greece and Ionian Islands. The major cities of the region of Western Greece are Patra, Aigio, Kato Achaia, Pyrgos, Amaliada, Messolonghi, Agrinio and Nafpaktos. The region includes three regional units. Moreover, the region is divided into 19 municipalities. (Table 12.1).

Western Greece is the fourth most populated region of Greece with 659,470 inhabitants in 2018, and the seventh most urbanized. Patra is the biggest city of the Region and a Functional Urban Region with 210,000 inhabitants, the third largest in mainland Greece. Moreover, Patra is a major port city and a significant commercial hub not only in the regional level but in the national as well, due to marine

connections with Italy. The region has experienced a slight population decline in the post-2008 period and a corresponding decreasing trend in its population density, which is significantly lower than the national and the EU average. The share of population (25-64 years) with tertiary education is 23.8%, which is below the national and European average. The population of the region lives predominantly in cities, as the urbanization rate is 61.7%, a value that is, however, below the national average.

Table 12.1. Information on the administrative structure of the region of Western Greece

Regional Administration	A Governor and a Regional Council are elected directly in Western Greece for a 4-year term.
Decentralised administration	Western Greece belongs to the Decentralized Administration of Peloponnese, Western Greece and Ionian Islands. The capital of the Decentralized Administration is the city of Patra.
Regional units (population)	Achaia (310,298), Aitoloakarnania (211,080), Ileia (161,226)
Municipalities	The Region of Western Greece has 19 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Patra with a population of 167,718 inh. (year 2011).
Other major cities (inhabitants)	Agrinio (45,947), Pyrgos (24,142), Aigio (20,184), Amaliada (16,487), Nafpaktos (13,378), Messolonghi (12,596), Gastouni (7,457), Kato Achaia (6,532), Agios Konstantinos (6,426), Paralia (6,296), Ovria (6,165), Rio (5,793) (year 2011) Patra is a Functional Urban Area (Medium Sized Area) with 210,000 inh
Regional institutions in South Aegean	University of Patras Open University University of Peloponnese Regional Association of Western Greece Municipalities Olympias Development Agency S.A. Aitoliki Development Agency S.A. Achaia Development Agency Trichonida Development Agency

Sources: ELSTAT (2019) OECD (2019b)

Ageing in Western Greece is an important issue as the share of population over 70 years old is higher compared to the Greek or EU levels and has also increased significantly (2.6%) during the crisis.[74] The elderly dependency ratio is showing that, since, in 2019, was at the level of 35.2%, which is slightly above the national average. (Table 12.2). The index of crude rate of net migration for the region of Western Greece is negative, though reduced (by 2.2%).

[74] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Table 12.2. Indicators for the population characteristics of the region of Western Greece

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	659,470	*4*	6[a]		-0.50	*11*
Population share (%) in the country, 2017	6.2	*4*			-1.7	*11*
Population density (inh/km^2), 2018	58.1	*6*	71	49	-0.50	*11*
(%) Population >70, 2011	15.4	*9*	104	116	2.6	*8*
Youth Dependency Ratio[b], 2019	22.22	*7*	99		-0.41	*11*
Elderly Dependency Ratio[b], 2019	35.24	*8*	102		1.47	*6*
(%) Population (25-64 years) with tertiary education [e]	23.8	*10*	77	78	3.2	*12*
Urbanization ratio, 2011	61.7	*7*	81		0.5	*5*
Crude rate of net migration[d], 2017	-2.8	*12*			-2.2[c]	*6*

Notes: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a).e: period 2001-2011.
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

The region is mostly specialized in the primary sector with GDP and employment levels well above the national and European average, but very low productivity. The region has a noticeable secondary sector with relative productivity higher than the national average and a tertiary sector with a share slightly below, and productivity slightly above the National average. Deindustrialization has been a serious problem since the '90s, as it is in several other Greek regions. (Table 12.3).

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors) that measures the specialization in production, shows that Western Greece has developed a strong specialization (with LQ>1.25) in agriculture (LQ 1.59), in information and communication (LQ 1.35), and in other services (LQ 1.26), and a slight weaker specialization in administrative and support services (LQ 1.11) and in construction (LQ 1.01). (Table 12.4).

Table 12.3. Indicators of the regional economy of Western Greece

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	10.6	*2*	259	683	4.3	*4*
(%) Secondary in GDP, 2016	16.0	*8*	94	64	-2.0	*12*
(%) Tertiary in GDP, 2016	73.3	*8*	93	99	0.0	*4*
(%) Primary in Employment, 2015	20.1	*3*	187	421	0.2	*5*
(%) Secondary in Employment, 2015	11.8	*11*	90	54	-4.6	*9*
(%) Tertiary in Employment, 2015	68.2	*8*	89	93	1.0	*10*
(%GDP)/(% Employment) Primary, 2016	0.5	*3*	138	162	4.7	*6*
(%GDP)/(% Employment) Secondary, 2016	1.4	*7*	105	119	3.1	*11*
(%GDP/(% Employment) Tertiary, 2016	1.1	*8*	104	107	-1.1	*5*

Sources: OECD (2019a), ELSTAT (2019)

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in the agricultural sector. (Table 12.4).

At a more disaggregated level (NACE2), the region presents a modestly diversified production base, as it has developed some level of specialization in 10 (out of 38) branches. (Table 12.4). Relatively strong specialization is in agriculture and wood branches, while weak to modest specialization exists in metal products, electronic, machinery, energy, construction, retail and education. The region exhibits overall specialization in 6 tradable branches.

The region could deal with its modestly diverse production base by developing value chains through local forwards and backwards linkages, especially in branches in which it exhibits specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers.[75] Only one branch appears to have regional multipliers greater than one, and that is not in tradable branches or in branches in which the region is specialized. This implies that in almost all branches an increase in demand (for example due to higher touristic flows, public spending, or exports) is not going to increase production by the same or higher amount.

[75] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Table 12.4. Sectoral specialisation in the region of Western Greece

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	1.59	*2*		
LQ in mining, energy, electricity, water supply, 2016	0.47	*8*		
LQ in manufacturing, 2016	0.95	*7*		
LQ in construction, 2016	1.01	*5*		
LQ in distr. trade, transport, accom., food serv., 2016	0.85	*8*		
LQ in information and communication, 2016	1.35	*2*		
LQ in financial and insurance activities, 2016	0.92	*7*		
LQ in professional, scientific and technical act., 2016	0.88	*6*		
LQ in administrative and support services, 2016	1.11	*5*		
LQ in other services, 2016	1.26	*2*		
RCA[b] in agricultural sector, 2012	4.6	*3*	7.4	*3*
RCA in resource-intensive sector, 2012	0.2	*9*	-5.4	*10*
RCA in labour-intensive sector, 2012	0.4	*7*	4.7	*6*
RCA in scale-intensive sector, 2012	0.4	*10*	-9.2	*10*
RCA in specialized supplier sector, 2012	0.7	*4*	-18.8	*10*
RCA in science-based sector, 2012	0.0	*12*	33.7	*2*
Diversification of productive base [c], 2011	10 (**0**/*6*)	*6*		
Sectors with regional multiplier effects >1[d], 2011	1(**0**/*0*)	*11*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)/A_r)/(A_(i,R)/A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)/X_r)/(X_(i,R)/X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performances and current trends

Western Greece is generating 5% of the National GDP being the 6th largest regional economy in Greece. Its development level, in GDP per capita terms, is relatively low compared to the national average (74%) and very low compared to the EU average (44%). Both GDP and GDP per capita have declined during the last decade by 3.9% and 3.5% respectively, experiencing one of the highest drops in welfare levels. The region is experiencing a high unemployment rate (24.6%) which is dramatically higher than the EU average (351%), and the second highest in the country. Unemployment on average has increased by 9.4% during the last decade, while the employment ratio has declined by 1.5%. The productivity level in Western Greece is one of the lowest in the country holding the 11th among the Greek regions and significantly lower compared to EU figure (53.2%). It has declined in the post-2008 period by 1.6%, which is one of the lowest drops among regions. The region is making small progress towards a more exporting economy, as regional merchandise exports are equal to 6.81% of GDP and have increased by 7.5% annually, placing Western Greece in the 9th and 8th place in the respective figures. Despite improvement in export performance, the figure is still below the national average (48%) and almost 1/5 of the EU average (21%). Western Greece has a fairly good performance in the European Regional Innovation Scoreboard, with a score that is equal to 63% of the EU average, ranking 4th among Greek regions. However, its performance has not improved during the last decade. (Table 12.5).

Table 12.5. Indicators of development, competitiveness and welfare for the region of Western Greece

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	National Rank	National average = 100 (national share)	EU=100	OECD	Annual change (%)	National Rank
GDP, 2016 (constant 2010 prices, ml. €)	8,511	6	5a			-3.9	11
GDP per capita, 2016 (€/inh.)	12,777	11	74	49	47%	-3.5	8
GDP share (%) in the country, 2017	4.5	6				-3.5	11
Employment share (%) in the country, 2017	5.74	4				-0.04	10
(%) Employment/Population, 2018	38.3	11	91	90		-1.5	11
(%) Unemployment, 2018	24.6	2	126	351	5d	9.4	3
Productivity (GVA/worker, thousand €), 2017	30.7	11	82	53.2c		-1.6	7
Merchandise exports to GDP ratio, 2016	6.8	9	48	21		7.5	8
Regional Innovation Scoreboard, 2017	64.8	4		63		0.0b	10

Notes: a: the value is the national share of the region, b: period 2009-2017, c: for the year 2016, d: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

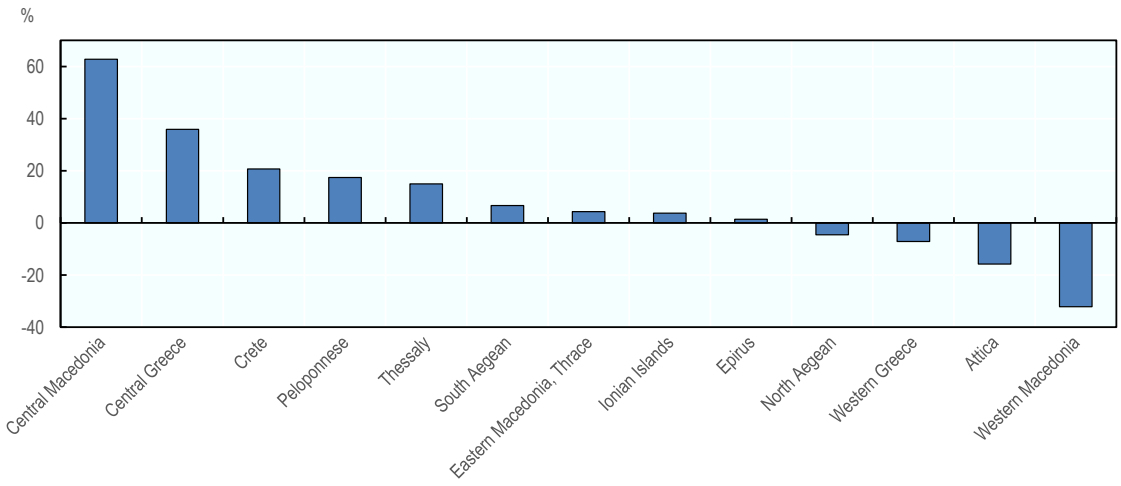
Western Greece is facing acute social problems as almost 7% of the population of the region does not have access to health services, 71.6% of jobless people are long-term unemployed, and 12.6% of the young people in the age group 15-24 are excluded from education or the labour market. Moreover, the share of population in danger of poverty and social exclusion is 44.6%. (Table 12.6). Between 2015 and 2017, Western Greece contributed, negatively, to the growth of national GDP by about -7% (Figure 12.3).

Table 12.6. Social indicators for the region of Western Greece (2018)

Social indicator (year)	Greece	Western Greece
Share of population with lack of access to health services	8.80	6.7
Long-term unemployment	70.3	71.6
Youth aged 15-24 excluded from education or the labour market	14.1	12.6
Share of people in danger of poverty or social exclusion	31.8	44.6

Source: Eurostat (2019b)

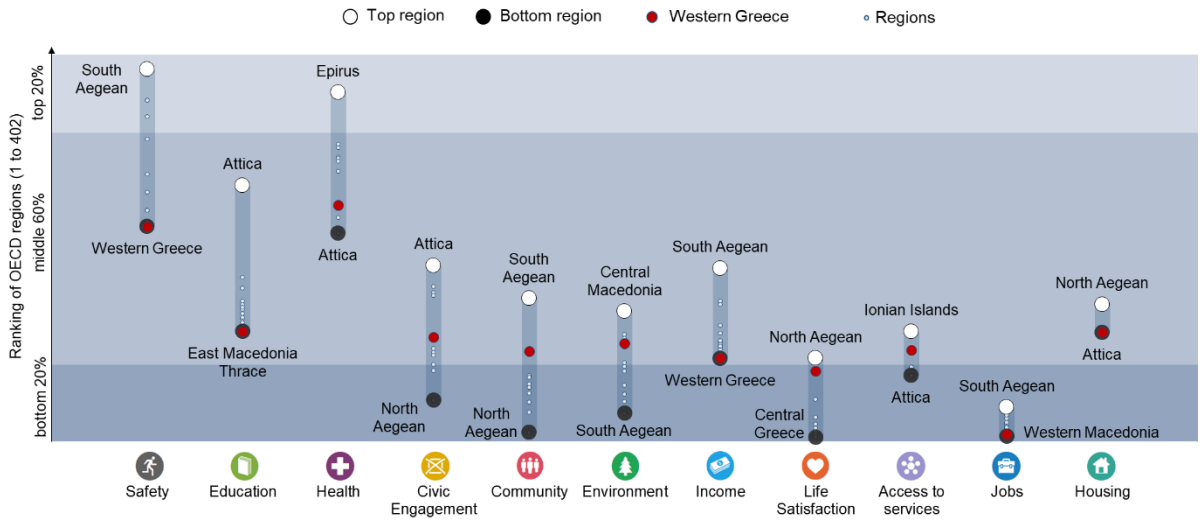
Figure 12.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Western Greece is varying in a number of well-being indicators estimated by OECD (2019c, Figure 12.4 and Table 12.7). Compared to 402 OECD regions, Western Greece belongs to the middle 60% group in the fields of safety, education, health, civic engagement, community, environment, income, access to services and housing. Compared to the other OECD regions, Western Greece has very low scores in terms of life satisfaction and jobs. When compared to the other Greek regions, Western Greece is above the national average in life satisfaction, community, environment, and access to services, close to the national average in health and housing, and towards the bottom end of the scale in terms of all other indicators.

Figure 12.4. Regional well-being indicators for Western Greece



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 12.7. Individual well-being indicators outcomes in Western Greece and Greece

	Country Average	OECD median region	Western Greece
Safety			
Homicide Rate (per 100 000 people), 2016	0,8	1,3	1,1
Education			
Labour force with at least upper secondary education (%), 2017	76,7	81,7	63,8
Health			
Life Expectancy at birth (years), 2016	81,5	80,4	81,2
Age adjusted mortality rate (per 1 000 people), 2016	7,5	8,1	7,5
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63,6	70,9	59,0
Community			
Perceived social network support (%), 2013	81,1	91,4	85,3
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18,4	12,4	17,8
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	10 738
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5,6	6,8	5,9
Access to services			
Households with broadband access (%), 2017	65,0	78,0	67,0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53,7	67,7	50,2
Unemployment rate 15 to 64 years old (%), 2017	21,8	5,5	26,8
Housing			
Rooms per person, 2016	1,5	1,8	1,5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Blue economy

Blue economy encompasses economic activities related to oceans, seas and coastal areas and it includes four main sectors: aquaculture, fishing, maritime, coastal tourism. According to the European Commission's 2018 Annual Economic Report on EU Blue Economy, these sectors are growing steadily, showing a total turnover of € 566 billion. Greece ranks among Europe's top five blue economies, with related sectors greatly contributing to its GDP and employment rates, in spite of the previous years' economic recession. In Greece, blue economy employs over 333 500 people and generates around € 7.2 billion in GVA.

The region of Western Greece participate to the European strategy for the Adriatic & Ionian macro-region EUSAIR, which foresees the blue growth and the Blue economy as a strategic pillar of development.

In Western Greece there are two areas characterized as PAY[76] by the National Special Framework for Spatial Planning and Sustainable Development of Aquaculture (Ambrakikos bay and Echinades Islands), which employ 24.3% of the aquaculture-related jobs of all Greece.

[76] PAYs are areas dedicated to the development of aquaculture activity – either with a relatively limited concentration of units in proportion to their characteristics or for fragmentary growth, resulting in a significant margin for further development. The PAY is organized in categories, (A), (B) (C), and (D) category. Category A of PAYs includes highly developed areas, with a significant concentration of sea farms that need to be modernized and improved, to protect the environment. For those areas, the creation of an AZA (Allocated Zones of Aquaculture) is mandatory, to promote the organized development of aquaculture. On the contrary, areas with high-value nature environments that need

According to the National Fisheries Data Collection Program (EPSAD, Final Report 2014 - part B), the professional fishing fleet in the region of Western Greece t harbors 5% of Greece's total fishing fleet with 3% capacity.

The region hosts twelve ports. The main and largest port is the port of Patra, which constitutes Greece's portal to Europe, and one of the most modern ports of the Mediterranean. The port of Katakolo has a significantly developed cruise activity with almost 200 cruise ship arrivals in 2019.

Revenues from tourism in Western Greece in 2018 represented 1% (€ 292 million) of the total incoming tourism revenues of the country, while the direct contribution of tourism to the GDP of the Region was 3%. During the period 2016-2019, the number of visitors increased by 59%. .

Enabling Factors

Transport, health and digital infrastructure and environment

The region of Western Greece is located in the western part of mainland Greece and is a gate to Central Europe through major waterways. Its road infrastructure is above national average but road freight transport has decreased over the last decade.

In terms of air and port transport, the region is behind the island regions that have developed a strong touristic industry. There is only one airport in the region (with very small traffic) which has a competitive position in the Trans European Transport Network. Also, three out of the four ports in the region are included in the Trans European Transport Network. Worth to note that the economic crisis has affected negatively both maritime and freight transport. Similarly, in terms of health infrastructure, the region holds the ninth position in the country with respect to the number of hospital beds per inhabitant, following the fact that during the crisis period presented a small decrease in this indicator. Finally, air pollution in Western Greece is significantly lower compared to the other regions (10th place) and is also declining (Table 12.8).

Table 12.8. Indicators of infrastructure for the region of Western Greece

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	33.8	*4*	111		
Commercial airports	1(*1*)[c]	*10*	3[a]		
Passengers in air transport/1000 inh, 2016	0.9	*7*	22	4.3	*6*
Commercial ports	4(*3*)[c]	*10*	3[a]		
Passengers in maritime transport/1000 inh, 2016	5.1	*4*	173	-3.7	*7*
Road freight transport (thousand tons/inh), 2017	33.8	*7*	73	-4.5[b]	*11*
Hospital beds/10,000inh., 2015	31.1	*9*	73.5	-0.9	*4*
Air Pollution in PM2.5 (µg/m³), 2017	13.9	*10*		-2.3	*6*

protection, with no significant concentration of sea farms, are included in category D of PAY. In those areas, an AZA is required, with adaptation to the special spatial and physical characteristics of the area.

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In Western Greece, the figures show that R&D-related expenditure is in a good level, compared to the national average in all the sub-categories (Table 12.9). Moreover, it increased during the crisis period.

Table 12.9. Indicators of innovation and development policies for the region of Western Greece

Indicator	Regional indicator		Comparison	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	153.4	*3*	95	4.5 [b]	*6*
R&D Expenditure in firms (€/inh), 2016	20.7	*4*	30	1.6[b]	*12*
R&D Expenditure in public sector (€/inh), 2016	42.2	*3*	104	17.7[b]	*5*
R&D Expenditure, tertiary education (€/inh), 2016	90.5	*3*	176	3.4 [b]	*3*
Patent applications per million inhabitants, 2015	1.5	*11*	16	-20.2	*10*
Public Investment (€), 2017	156,264,538	*5*	5[a]	-5.4	*10*
Public Investment per capita (€/inh), 2017	235.3	*7*	85	-5.1	*7*
% ESPA allocated to the region	19.8	*3*			
% National Rural Development Program allocated to the region	9.1	*6*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Sources: National Documentation Centre (2019), Ministry of Development and Investments (2019 and 2020)

Notably, the tertiary education sector (University of Patras and University of Peloponnese) has a high figure above the national average. In terms of patent applications per million inhabitants, Western Greece holds the eleventh position in the country, which is below the national average indicating a significant gap with the front-runner (Attica). Moreover, the index has worsened during the crisis showing that R&D expenditure is not well connected to the productive base of the region.

Public Investments and European Structural Funds in Western Greece

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation gives an indication of the commitment of the State to regional cohesion and balanced growth. Western Greece receives 5% of the Public Investment national budget against a population share of 6% and a GDP share of 5%. As a result, the per capita figure is lower than the national average (Table 12.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is better aligned to the economic characteristics of the region, as Western Greece receives 8.5% of the amount of ESPA allocated to Regional Operational Programs in Greece and 19.8% of the total amount of ESPA. Western Greece has also received 9.1% of the Rural Development Program (Common Agricultural Policy), a figure that is the sixth highest among the Greek regions and corresponds to the size of the agricultural sector of the region (Table 12.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Western Greece includes the Vision, the Objectives and the 11 Priorities (same with the 11 ESIF Thematic Objectives[77]) that define the development strategy of the Region. The Vision of the region is “the self-sustaining, extroverted and sustainable reconstruction with a focus on a globally distinct identity, human values and the environment”.

The strategic Objectives are:

1. Strengthening competitiveness and enterprise extroversion, transition to qualitative entrepreneurship, spearheaded innovation and increasing domestic value added.
2. Environmental Protection – transition to an economy-friendly environment.
3. Development – modernization – completion of transport infrastructure.
4. Human Resources Development, Promoting Social Inclusion and Combating Poverty and Discrimination
5. Development – modernization – supplementing social infrastructure, health and education infrastructure.

The Regional Operational Program (ROP) of Western Greece is about 449 million euro, measured in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). Less than half of these funds are for environmental (29.9%) and transport (18.1%) projects or actions, while a high share of resources is devoted to human resources development and protection (34.3%). A relatively smaller amount is available for actions in support of entrepreneurship (11.7%) and for research and technology (3.9%) (Table 12.10).

[77] The 11 Thematic Objectives of the ROP are in fact the Thematic Objectives of the ESIF 2014-20 and are common for all regions. They are: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning; (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration.

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Western Greece assigns more resources to entrepreneurship (111%), transport (110%) and environment (102%) and less to human capital and social care (90%), and research and technology (79%).

The progress in the implementation of the ROP has been slowly improving during 2020, reaching about 77.8% of the budget of ROP (by early December 2020) contracted for projects and actions and 41.2% actually spent. The lower progress in the implementation process in terms of spending is observed in the research and technology (7.1%) and transport (20%), better performing priorities being entrepreneurship (28.6%), environment (29.5%) and human capital and social care (58.4%). Considering the actual progress, deviation from the overall performance of the ROPs is limited, with the exception of research and transport sub-programs (Tables 12.10).

Table 12.10. Indicators for the Regional Operational Programs of the region of Western Greece

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP total budget. (Public expenditure) (€), 2014-2020	449,335,884	*4*	8.50[a]	77.8	*89 (10)*	41.2	*94 (9)*	
% ROP in research and technology	3.9	*8*	88	79.4	*172 (2)*	7.1	*54 (8)*	
% ROP in entrepreneurship	11.7	*2*	145	65.6	*42 (12)*	28.6	*77 (8)*	
% ROP in human capital and social care	34.3	*6*	92	105.7	*101 (5)*	58.4	*102 (9)*	
% ROP in environment	29.9	*7*	97	67.8	*111 (4)*	44.8	*132 (4)*	
% ROP in transport	18.1	*5*	106	52.8	*66 (11)*	20.0	*46 (11)*	
% ROP in technical support	2.0	*9*	97	46.7	*85 (9)*	24.8	*72 (9)*	

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 2.56 billion euros) allocated to Western Greece by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development).[78] Table 12.11 shows that the SOPs of ESPA directed to Western Greece allocate the higher share to transport (the highest in the country), followed by human capital and then, almost equally, to entrepreneurship and environment and significantly lower resources to research and technology. These

[78] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

programs also reserve some resources for the restructuring and modernization of public administration in Western Greece (1.5%).

Table 12.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Western Greece

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-2020	2,560,426,540.31	*3*	10.05[a]	59.5	*80 (13)*	30.6	*79 (13)*
% ESPA in research and technology	8.4	*9*	84	53.6	*108 (4)*	23.4	*116 (3)*
% ESPA in entrepreneurship	16.6	*11*	63	96.9	*100 (7)*	48.3	*104 (4)*
% ESPA in human capital and social care	25.2	*5*	105	58.8	*63 (13)*	34.9	*69 (13)*
% ESPA in environment	15.6	*13*	62	47.8	*99 (8)*	27.6	*102 (6)*
% ESPA in transport	30.2	*1*	294	44.1	*75 (8)*	18.4	*49 (13)*
% ESPA in administration	1.5	*7*	98	69.4	*96 (8)*	38.1	*112 (4)*
% ESPA in technical support	2.6	*4*	97	91.0	*102 (3)*	53.9	*101 (5)*

Source: Ministry of Development and Investments (3 December 2020)
Notes: a: the value is the national share of the region.

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is well represented by the combined allocation of funds in both the ROP of Western Greece and the SOPs. Table 12.12 shows that significant resources are available in the ROP for human capital and social inclusion (154 million euros). Most of these funds are addressing social inclusion actions (109 million euros) a smaller share is for education and lifelong learning (37 million euros) and actions supporting employment (almost 8 million euros). However, as shown in Table 12.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the

deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 86% and payments 46% of the budget.

Moving to R&D, Western Greece characterizes by a modest performance as highlighted in the introductory paragraph. Its R&D expenditure per capita is about 95% of the national average, while its expenditure by firms per capita is 30% of the national average. Despite the serious gap, the ROP of Western Greece allocates a relatively small amount to R&D and innovation actions (17.6 million euros), which absorption in addition is very poor, although already contracted to 85%.

The ROP budget also reserves 53 million euros to Smart Specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is contracted at 85%, but payments are still low.

Table 12.12. The funds of the ROP of Western Greece for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of Budget, %
Skills	154,195,025.00	195,781,933	162,929,618	83.2	89,982,860	46.0
Employment	7,951,216.00	1,353,970	1,353,970	100.0	0	0.0
Education and Lifelong Learning	37,172,827.00	38,154,301	26,933,507	70.6	17,927,202	47.0
Social Inclusion	109,070,982.00	156,273,661	134,642,140	86.2	72,055,658.72	46.1
Innovation	17,612,562.00	19,313,545	13,978,853	72.4	1,245,442	6.4
Research Technology Innovation	10,735,113.00	13,904,776	13,904,776	100.0	1,245,442	9.0
Information and Communication Technologies	6,877,449.00	5,408,769	74,078	1.4	0	0.0
Smart Specialization	52,778,324.00	40,740,026	34,618,766	85.0	15,115,613	37.1
SME's Competitiveness	52,778,324.00	40,740,026	34,618,766	85.0	15,115,613	37.1

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

In addition to the funds allocated in the ROP, Western Greece receives a significantly larger amount from the Sectoral Programs in these fields. Table 12.13 shows that Western Greece receives from the respective SOPs additional 644 million euros for human capital and social inclusion, 426 million euros for Smart Specialization and 214 million euros for Innovation. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and not on social protection, as the later has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is relatively satisfactory, as 58.8% of the allocated budget has been contracted and 34.9% spent. In addition, the analysis of the programming and implementation figures that the SOPs devote significant funds on innovation and ICT that have a satisfactory degree of contracting (53.6%), but a low degree of spending (23.4%). Finally, the funds for the Smart Specialization are mostly business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that is by 96.9% contracted, but again payments and absorption are still relatively low (48.3%).

Table 12.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Western Greece

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		644,319,453	378,949,274	58.8	224,557,138	34.9
Employment		241,793,418	164,973,659	68.2	108,907,118	45.0
Education and Lifelong Learning		379,103,971	191,083,391	50.4	94,364,667	24.9
Social Inclusion		23,422,063	22,892,224	97.7	21,285,352.64	90.9
Innovation		214,453,444	114,956,506	53.6	50,250,321	23.4
Research Technology Innovation		72,452,935	37,653,904	52.0	15,512,582	21.4
Information and Communication Technologies		142,000,509	77,302,602	54.4	34,737,738	24.5
Smart Specialization		425,528,580	412,462,916	96.9	205,400,296	48.3
SME's Competitiveness		425,528,580	412,462,916	96.9	205,400,296	48.3

Note: *There is no predefined commitment for each region.
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

The gap between contracting and spending may be explained by a number of factors, which include: (i) the late start of the programs (some of them launched in 2017); (ii) cumbersome administrative procedures; (iii) the lengthy period that R&D and innovation projects need to be designed and implemented; (iv) the weak banking sector, which is reluctant to provides loans or guarantee funds for businesses investment.

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Western Greece is the 6th largest regional economy in Greece with a low level of development compared to the national and the EU average and a high rate of unemployment. The economy of Western Greece includes an important primary sector, a noteworthy secondary sector, and a large tertiary sector. The primary sector is, mainly, based on the agriculture and livestock and exhibits low levels of relative productivity. The secondary sector is, mainly, based on construction and on labour-intensive industries (such as wood), with satisfactory levels of relative productivity. The tertiary sector shows satisfactory levels of relative productivity, mainly, based on information and communication technologies, and on administrative and support services. Western Greece has the potential to further strengthen the development of the information and communication technologies industry. This study identifies opportunities for Western Greece to improve its development path and foster employment in three main areas:

1. Strengthening and diversifying the productive base of the regional economy
2. Pursuing an innovation-oriented and knowledge-intensive regional society
3. Enhancing the performance and impact of EU Structural funds

Strengthening and diversifying the productive base of the regional economy

Western Greece specializes in agriculture and in information and communication technologies, and it has a modestly diversified economic base. Western Greece lags behind in innovative activities, lacks significant value chains, and connotes by limited export and low regional multipliers.

Accordingly, targeted policy interventions should support actions to:

1. Develop a strong scientific base (Universities, Research Centres) that is going to support key economic sectors in order to become innovate and competitive and to attract high-quality human resources to the region.
2. Transform local and regional government into an effective mechanism for supporting economic activities and new investment in the region by developing appropriate development and spatial plans as well as appropriate investment licensing policies.
3. Transform the region into an academic destination by developing strong Universities, but also University infrastructure and services, to attract students and scientists from other regions and other countries to study, research and work, highlighting Higher Education in an important industry for the region.
4. Support existing industrial sectors in which the region already has a comparative advantage and skilled labour in order to modernize production technology, improve its products and pursue new export markets.
5. Develop the energy sector through investments in renewable projects, such as solar, wind, hydroelectric and local energy networks, that are going to reduce energy costs in production and make the region a more attractive investment destination.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Western Greece faces with significant challenges in terms of improving the innovative capacity of its productive sector. The performance of Western Greece in terms of innovation indicators has not advanced during the last decade, and this indicates that the region has, still, significant room for improvement under many aspects, e.g. the need to be more business-driven. Nevertheless, the current ROP of Western Greece allocates a relatively small amount of funds for R&D and innovation actions (approximately 17.6 million euros), whose implementation, in addition, is experiencing a serious delay.

The fact that the University of Patras appears in the Times Higher Education (Times Higher Education, 2019) global ranking in the 801-1000 ranking category, reflects that there are, still, unexploited possibilities for the production of relatively high-quality research in the region, which can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of Western Greece is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

Western Greece needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the Universities in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

1. Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Western Greece needs to build further on the existing experience of the administration, the

Universities, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.

2. Address the issue of 'ownership' of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Western Greece needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
3. Enhance the business-academy collaboration in Western Greece, making a better use of the available funds for industrial research and innovation. This can be caught-up by building on the experience of these actors (especially the University, but also some businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, whose potential is not fully exploited because of modest progress in the implementation of the Regional Development Program (ROP) and to some extent also of the Sectoral Operational Programs (SOPs). The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects complement the corresponding ROP's projects – as they do not cover the same type of actions - as regards Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), Thematic Objective 7 (promoting sustainable transport and removing bottlenecks in key network infrastructures), Thematic Objective 9 (promoting social inclusion, combating poverty and any discrimination), Thematic Objective 10 (investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure), and Thematic Objective 11 (enhancing institutional capacity of public authorities and stakeholders and efficient public administration through actions to strengthen the institutional capacity and the efficiency of public administrations and public services related to the implementation of the ERDF, and in support of actions under the ESF to strengthen the institutional capacity and the efficiency of public administration). In contrast, the centrally-implemented SOPs' projects play a rather competing role with the corresponding ROP'S projects as regards Thematic Objective 1 (strengthening research, technological development and innovation), Thematic Objective 2 (enhancing access to, and use and quality of, ICT), and Thematic Objective 3 (enhancing the competitiveness of SMEs), either because of the calls' overlapping timing or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in Western Greece, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit in full the sub-program for Research and Technology not yet activated in the ROP. To be noted that some regional stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
2. Better focus the ROP financial intervention by targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by incorporating in the ROP all the place-specific projects and actions implemented in the region,

while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.

4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional spatial plan.

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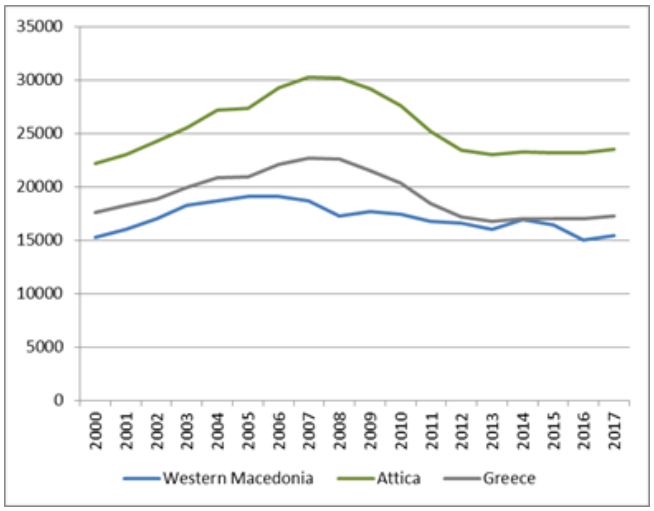
13 Western Macedonia

Figure 13.1. Map 1.1. The location of the region of Western Macedonia

Figure 13.2. GDP per capita in Western Macedonia (€/inh, const. 2010 prices)



Source: Territorial Review of Greece, OECD 2020

Local Government, Geography and Demography

Western Macedonia is located in the northwest of Greece and shares borders with Albania and the Republic of North Macedonia. It is the only landlocked region in the country. The city of Kozani, with about 40,695 inhabitants, is the capital of the Regional Administration of Western Macedonia. The major cities in the region are Kozani, Florina, Kastoria and Grevena, which are the centres of the respective regional units, but also the city of Ptolemaida, with the second higher population in the region, due to the presence of significant power stations. The region counts on 13 municipalities, covering urban areas and rural areas (Table 13.1).

Western Macedonia is one of the least populated regions of Greece with 269,222 inhabitants in 2018, and the ninth in ranking urbanized area. The region has experienced the smallest decline in the population and the population density in the post-2008 period.

Table 13.1. Information on the administrative structure of the region of Western Macedonia

Regional Self Government	A Governor and a Regional Council are elected directly in Western Macedonia for a 4-year term.
Decentralised administration	Western Macedonia belongs to the Decentralized Administration of Epirus and Western Macedonia. The capital of the Decentralized Administration is the city of Ioannina
Regional units (population)	Kozani (150,170), Florina (51,841), Kastoria (50,683), Grevena (32,308).
Municipalities	The Region of Western Macedonia has 13 Municipalities (out of the 332 Municipalities in Greece) directly electing Mayor and City Council every 4 years.
Capital city	The city of Kozani with a population of 40.695 inh. (year 2011) and a Functional Urban Area (FUA) of 200,000 inh. (2015).
Other major cities (inhabitants)	Ptolemaida (31,887), Florina (17,683), Kastoria (13,273), Grevena (12,994).
Regional institutions in Western Macedonia	University of Western Macedonia Regional Association of Western Macedonia Municipalities Florina Development Agency S.A (ANFLO S.A) Kastoria Development Agency S.A (ANKAS S.A) Dytiki Makedonia Development Agency S.A (ANKO S.A)

Sources: ELSTAT (2019) OECD (2019b)

Ageing in Western Macedonia is an important issue as the share of population over 70 years old is significantly higher compared to the Greek or EU levels and has also increased significantly (3.5%) during the crisis[79]. This is also verified from the elderly dependency ratio that, in 2019, was at the level of 38.2%, which is above the national average. The share of population (25-64 years) with tertiary education is 24.5%, which is below to the national and European average. The population of the region lives predominantly in cities, as the urbanization rate is 57.9% which is below the national average. However, the region during the post-2008 period showed the highest increase in the urbanisation ratio. The region, also, ranked fifth in the increase of the population (25-64 years) with tertiary education. Finally, the index of crude rate of net migration for the region of Western Macedonia is negative reflecting the emigration-generated population decrease in the area, while it is presenting the highest in the country negative change (Table 13.2).

[79] Greece confronts acute problem of population ageing as 40% of the population is expected to be over 65 years by 2050 (OECD 2017).

Table 13.2. Indicators for the population characteristics of the region of Western Macedonia

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
Population, 2018	269,222	*11*	3[a]		-0.6	*13*
Population share (%) in the country, 2017	2.5	*11*			-2.7	*12*
Population density (inh/km^2), 2018	28.5	*13*	35	24	-0.6	*13*
(%) Population >70, 2011	17.2	*4*	116	130	3.5	*3*
Youth Dependency Ratio[b], 2019	21.1	*13*	94		-1.2	*13*
Elderly Dependency Ratio[b], 2019	38.2	*4*	110		1.1	*10*
(%) Population (25-64 years) with tertiary education [e]	24.5	*8*	79	78	3.7	*5*
Urbanization ratio, 2011	57.9	*9*	76		0.9	*1*
Crude rate of net migration[d], 2017	-3.2	*13*			-4.4[c]	*13*

Notes: a: the value is the national share of the region, b: Youth & Elderly dependency ratios constructed with -15 & 65+ over 15-64 working age population data, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a). e: period 2001-2011
Source: ELSTAT (2019) - OECD (2020). Regions and Cities database. Accessed on 5 April 2020.

Regional Economy

Structural characteristics and sectoral specialisations

The productive structure of the region includes an important primary sector displaying a high GDP share in its economy (about 2.2 times as much as the national average and 5.8 times as much as the European average). The relative productivity of the primary sector in the Western Macedonia is equally significant holding the second position among the regions and with a much better performance than the EU (1.7 times than the EU average). The region is, at large, mountainous but its agricultural production is based on some significant agricultural products such as the Kozani saffron, aromatic and energy plants, peaches, wines, apples, peppers, vegetables and legumes and some livestock products like milk and cheese (Table 13.3).

Besides, it is the secondary sector that plays a major role in the regional economy, displaying the highest share in GDP and holding the second position in the relative productivity among the Greek regions. The industrial activity of Western Macedonia is based on its coal power plants, which for decades have been supplying electricity to the entire country. However, the secondary sector of the region is facing the challenge of the post-lignite era and has to be transformed and developing new activities that will enrich its production base (WWF 2016). As far as the tertiary sector is concerned, this is the largest sector in the region but with the smallest share and productivity level in relation to the other Greek regions (Table 13.3).

Table 13.3. Structural indicators of production in the region of Western Macedonia

Indicator	Regional indicator		Comparisons		Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	Annual change (%)	*National Rank*
(%) Primary in GDP, 2016	9.0	*4*	220	579	5.4	*2*
(%) Secondary in GDP, 2016	42.4	*1*	249	171	1.1	*1*
(%) Tertiary in GDP, 2016	48.6	*13*	62	65	-1.6	*13*
(%) Primary in Employment, 2015	15.9	*7*	148	333	-1.3	*11*
(%) Secondary in Employment, 2015	22.0	*1*	167	101	-2.9	*2*
(%) Tertiary in Employment, 2015	62.2	*10*	82	84	1.7	*1*
(%GDP)/(% Employment) $_{Primary}$, 2016	0.6	*2*	148	174	7.8	*2*
(%GDP)/(% Employment) $_{Secondary}$, 2016	1.9	*2*	149	169	4.8	*5*
(%GDP/(% Employment) $_{Tertiary}$, 2016	0.8	*13*	75	78	-3.6	*13*

Sources: OECD (2019a), ELSTAT (2019)

The Location Quotient (LQ) index (ISIC Rev4, branches grouped in 10 sectors), which measures the specialization in production, shows that Western Macedonia has developed a (strong) specialization (with LQ>1.25) only in the sector of mining, energy, electricity and water supply (Table 13.4).

The Revealed Comparative Advantage (RCA) index is a measure of export-related sectoral specialization. According to this, the productive structure of the region leads to an export structure with strong or significant specializations (RCA>1.25) in labour-intensive sectors.

Western Macedonia shows a less diversified production base, as it has developed some level of specialization in 8 (out of 38) NACE2 branches. Strong or high specialization is exhibited in mining and quarrying, energy supply and textile, wearing apparel and leather products, while weak to modest specialization in agriculture, repair and installation of machines and equipment, construction, education, and public administration and defence. The region displays overall specialization in 4 tradable branches.

The region has to deal with low levels of diversification and develop value chains through local forwards and backwards linkages, especially in the branches of specialization. However, these linkages are weak and the region's prospects for growth are hindered by low regional multipliers.[80] Only four branches appear to have regional multipliers greater than one, one of them is in tradable sectors and none in branches in which the region exhibits specialization. This implies that in most cases an increase in regional demand (for example due to higher touristic flows, public spending, or exports) does not lead to an equal or higher increase in regional production.

[80] Regional multipliers measure the increase in production in a sector (i) in a region (r) that will result from an increase in demand in the same sector and region. High multipliers occur in regions with strong forward and backward linkages among local sectors enabling that most of the value-added from the production process is generated (and transformed to incomes) locally.

Table 13.4. Structural indicators of production in the region of Western Macedonia

Indicator	Regional indicator		Change in indicator (2008-latest year)	
	Level	*National Rank*	Annual change (%)	*National Rank*
LQ[a] in agriculture, forestry and fishing, 2016	0.88	*8*		
LQ in mining, energy, electricity, water supply, 2016	6.36	*1*		
LQ in manufacturing, 2016	0.48	*10*		
LQ in construction, 2016	0.76	*12*		
LQ in distr. trade, transport, accom., food serv., 2016	0.37	*13*		
LQ in information and communication, 2016	0.5	*12*		
LQ in financial and insurance activities, 2016	0.68	*12*		
LQ in professional, scientific and technical act., 2016	0.79	*9*		
LQ in administrative and support services, 2016	0.75	*10*		
LQ in other services, 2016	0.56	*13*		
RCA[b] in agricultural sector, 2012	0.7	*10*	2.4	*7*
RCA in resource-intensive sector, 2012	0.1	*12*	-13.9	*12*
RCA in labour-intensive sector, 2012	9.2	*1*	8.8	*3*
RCA in scale-intensive sector, 2012	0.5	*9*	16.7	*1*
RCA in specialized supplier sector, 2012	1.2	*3*	21.9	*1*
RCA in science-based sector, 2012	0.0	*13*	7.4	*4*
Diversification of productive base[c], 2011	8 (**3**/4)	*12*		
Sectors with regional multiplier effects >1[d], 2011	4(**0**/*1*)	*5*		

Note: a) LQ is the location quotient index, which evaluates the sectoral specialisation of regions and it is estimated as follows: 〖LQ〗_(i,r)=(A_(i,r)⁄A_r)/(A_(i,R)⁄A_R), where A the GVA, i the sector, r the region and R the country; b) RCA is the index of Revealed Comparative Advantage, which estimates the relative size of exports of a region in a sector as follows: 〖RCA〗_(i,r)=(X_(i,r)⁄X_r)/(X_(i,R)⁄X_R), where X the exports, i the sector, r the region and R the country; c) Number of NACE2 sectors with weak/modest or strong specialization in the region (total number of sectors is 38). Bold indicates strong specialization, italics indicates specialization in tradable sectors; d) Total number of Sectors. In bold sectors of specialization, in italics tradable sectors.
Sources: OECD (2019a), ELSTAT (2019), University of Peloponnese (2013).

Regional performances and current trends

Western Macedonia is generating 2.2% of the National GDP, the tenth in regional economy ranking in Greece. Its development level, in GDP per capita terms, is relatively lower compared to the national average (88%) and very low compared to the EU average (58%). Both GDP and GDP per capita have declined during the last decade by 2.2% and 1.6% respectively, experiencing the smallest drop in welfare levels. The productivity level in Western Macedonia holds the second position in the country mainly due to the coal power plants that it hosts. The productivity level declined in the post-2008 period by 0.2%, which is the lowest drop among regions.

The region has not shown significant progress towards a more export-oriented economy, as regional merchandise exports are equal to 7.9% of GDP and have increased only by 0.4% annually, placing Western Macedonia in the 8th and 13th place in the respective figures. This is nearly half the national (56%) and a quarter (24%) of the European figures. As regards the performance of Western Macedonia in the European Regional Innovation Scoreboard, the region is ranking in the 5th place among Greek regions but equals to just 61% of the EU average. However, the index presented the highest increase among the Greek regions during the last decade.

Western Macedonia is experiencing the highest unemployment rate (27.5%) that is dramatically exceeding the national and the EU average. Unemployment on average has increased by 8% during the last decade, while the employment ratio has declined by 1.5%.

Table 13.5. Indicators of development, competitiveness and welfare for the region of Western Macedonia

Indicator	Regional indicator		Comparisons			Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	EU=100	OECD=100	Annual change (%)	*National Rank*
GDP, 2016 (constant 2010 prices, ml. €)	4,149	*10*	2[a]			-2.2	*1*
GDP per capita, 2016 (€/inh.)	15,218	*5*	88	58	56	-1.6	*1*
GDP share (%) in the country, 2017	2.2	*10*				12.1	*1*
Employment share (%) in the country, 2017	2.2	*11*				-0.2	*11*
(%) Employment/Population, 2018	36.7	*13*	88	87		-1.5	*10*
(%) Unemployment, 2018	27.5	*1*	140	393	2[f]	8.0	*7*
Productivity (GVA/worker, thousand €), 2017	38.4	*2*	109.9	66[e]		-0.2	*1*
Merchandise exports to GDP ratio, 2016	7.9	*8*	56	24		0.4	*13*
Regional Innovation Scoreboard, 2017	62.9	*5*		61		3.4[b]	*1*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: difference of the values for the years 2008 and 2017, d: calculated as the difference between the total change and the natural change of the population (OECD 2019a), e: for the year 2016, f: Ranking per high unemployment among 347 OECD regions (OECD, 2018)
Sources: OECD (2019a, 2019c), ELSTAT (2019), Eurostat (2019a).

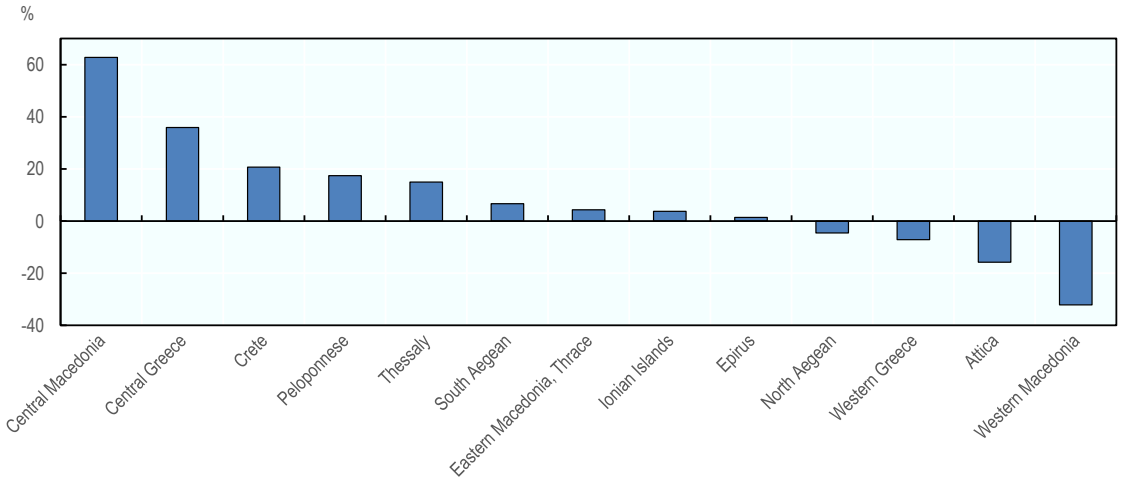
According to the analysis undertaken and the Social Scoreboard indicators published by Eurostat (2019b), Western Macedonia is facing acute social problems related to the condition of its human resources (Table 13.6). The figures show that almost 9% of the population of Western Macedonia does not have access to health services, a value slightly lower than national average. Moreover, 72% of jobless people are long-term unemployed, 20% of the young people in the age group 15-24 are excluded from education or the labour market, while the share of population in danger of poverty and social exclusion almost 37%. Between 2015 and 2017, Western Macedonia contributed negatively to the growth of national GDP for about -32% (Figure 13.3).

Table 13.6. Social indicators for the region of Western Macedonia, 2018

Social indicator (year)	Greece	Western Macedonia
Share of population with lack of access to health services	8.8	8.6
Long-term unemployment	70.3	71.6
Youth aged 15-24 excluded from education or the labour market	14.1	20.2
Share of people in danger of poverty or social exclusion	31.8	36.7

Source: Eurostat (2019b)

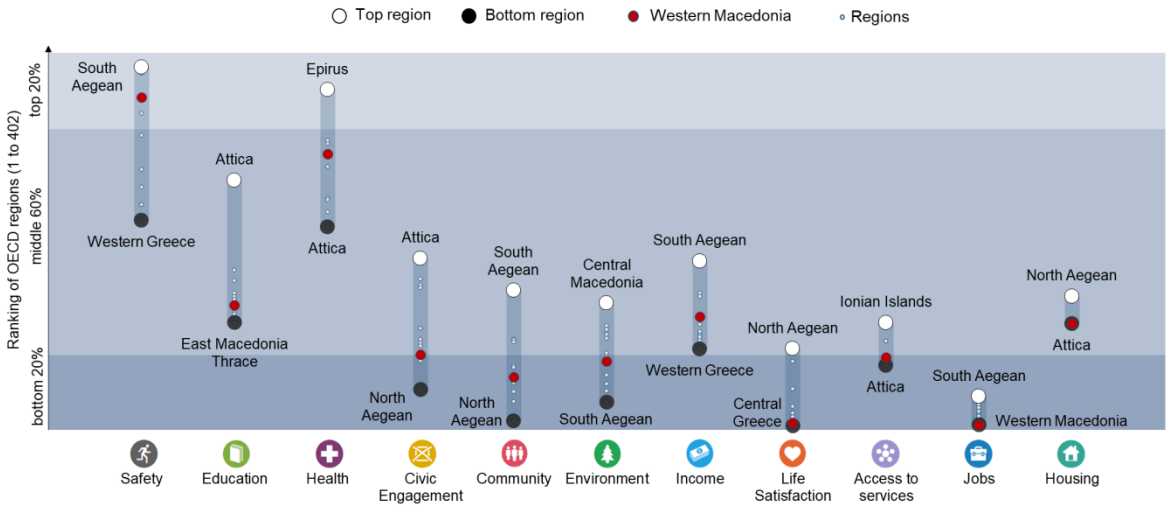
Figure 13.3. Regional contribution to national GDP growth in Greece, 2015-2017



Note: Regional contribution to national growth is calculated as an interaction of region's growth in GDP between 2015 and 2017 and 2017 share of regional in national GDP, and further normalised by overall Greek GDP growth in the given period to calculate the share. The figure portrays positive contribution if the growth rate in the region was positive, and negative if GDP fell in the region, rescaled by the size of the contribution.
Source: OECD (2020). Regions and Cities database. Accessed on 18 February 2020.

The performance of Western Macedonia is varying in a number of well-being indicators estimated by OECD (2019c, figure 13.4 and table 13.7). Compared to 402 OECD regions, Western Macedonia belongs to the middle 60% group in the fields of safety, education, health, civic engagement, income, and housing. Compared to the other OECD regions, Western Macedonia is having a relatively high score in safety and health and very low scores in terms of education, civic engagement, community, income, access to services and jobs. When compared to the other Greek regions, Western Macedonia is above the national average in safety, close to the national average in income, health, community and housing, below the national average in education, civic engagement, environment, life satisfaction, access to services and jobs.

Figure 13.4. Figure 1.3. Regional well-being indicators for Western Macedonia



Source: OECD Regional Well-Being Database, www.oecdregionalwellbeing.org.

Table 13.7. Individual well-being indicators outcomes in Western Macedonia and Greece

	Country Average	OECD median region	Western Macedonia
Safety			
Homicide Rate (per 100 000 people), 2016	0.8	1.3	0.4
Education			
Labour force with at least upper secondary education (%), 2017	76.7	81.7	69.2
Health			
Life Expectancy at birth (years), 2016	81.5	80.4	81.8
Age adjusted mortality rate (per 1 000 people), 2016	7.5	8.1	7.0
Civic engagement			
Voters in last national election (%), 2017 or lastest year	63.6	70.9	54.3
Community			
Perceived social network support (%), 2013	81.1	91.4	80.6
Environment			
Level of air pollution in PM 2.5 (µg/m³), 2015	18.4	12.4	19.8
Income			
Disposable income per capita (in USD PPP), 2016	12 958	17 695	13 096
Life Satisfaction			
Life satisfaction (scale from 0 to 10), 2013	5.6	6.8	4.9
Access to services			
Households with broadband access (%), 2017	65.0	78.0	62.0
Jobs			
Employment rate 15 to 64 years old (%), 2017	53.7	67.7	48.3
Unemployment rate 15 to 64 years old (%), 2017	21.8	5.5	29.7
Housing			
Rooms per person, 2016	1.5	1.8	1.5

Source: OECD Regional Well-Being Database www.oecdregionalwellbeing.org.

Enabling Factors

Transport, health digital infrastructure and environment

The region is located at the north of Greece bordering with Albania and North Macedonia and is the only landlocked Greek region. The transport infrastructure of Western Macedonia, as the relevant indicators show, is below the national average and (in a number of them) among the last placed regions. In terms of road density, Western Macedonia holds the tenth position in the country; however, the freight transport, due to the node position of the region (specifically of Kozani region), is extremely significant reaching the highest value in the country (Table 13.8).

In terms of air transport, Western Macedonia holds the fifth position in the number of commercial airports (has one airport with comprehensive network in Europe) but the penultimate position in the number of passengers per inhabitant. As opposite, in terms of health infrastructure, the region holds the fifth position in the country with respect to the number of hospital beds per inhabitant, and during the crisis period presented one of the lowest decreases of this indicator.

Finally, air pollution in Western Macedonia is in high levels compared to the other regions (4th place) and presents a modest rate of decline in the country (2.3%) the last decade.

Table 13.8. Indicators of infrastructure for the region of Western Macedonia

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
Road network per km² (km/100 km²), 2018	28.2	*10*	92		
Commercial airports	2(*1*)[c]	*5*	5		
Passengers in air transport/1000 inh, 2016	0.1	*12*	1	6.3	*2*
Commercial ports					
Passengers in maritime transport/1000 inh, 2016					
Road freight transport (thousand tons/inh), 2017	695.3	*1*	1504	5.4	*4*
Hospital beds/10,000inh., 2015	42.3	*5*	100	-0.7	*3*
Air Pollution in PM2.5 (μg/m³), 2017	16.9	*4*		-2.3	*8*

Notes: a: the value is the national share of the region, b: period 2009-2017, c: the value in parenthesis is the number of airports/ports with significant role at the European level (bold: with core network, italics: with comprehensive network).
Sources: Eurostat (2019a), ELSTAT (2019), OECD (2019a), EU (2013)

Innovation, human capital and skills

R&D expenditure at the regional level is an indicator of the capacity of the local science and productive base to innovate, but also a measure of the commitment of the public and private sectors to support innovation, structural adjustments and competitiveness. In the case of Western Macedonia, the figures show extremely low R&D-related expenditure compared to the national average in all the sub-categories of private, public and education sector.

On the contrary, in terms of patent applications per million inhabitants Western Macedonia holds the second position in the country above the national average (153 against the 100 index corresponding to national average) (Table 13.9).

Table 13.9. Indicators of innovation and development policies for the region of Western Macedonia

Indicator	Regional indicator		Comparisons	Change in indicator (2008-latest year)	
	Level	*National Rank*	National average = 100 (national share)	Annual change (%)	*National Rank*
R&D Expenditure (€/inh), 2016	43.1	*11*	27	8.6[b]	*1*
R&D Expenditure in firms (€/inh), 2016	8.5	*8*	12	26.5[b]	*3*
R&D Expenditure in public sector (€/inh), 2016	14.4	*11*	36	6.9[b]	*10*
R&D Expenditure, tertiary education (€/inh), 2016	20.0	*10*	39	6.2[b]	*2*
Patent applications per million inhabitants, 2015	14.5	*2*	153		
Public Investment (€), 2017	220,162,309	*3*	7[a]	2.0	*2*
Public Investment per head (€/inh), 2017	810.9	*1*	291	2.4	*2*
% ESPA allocated in the region	3.0	*11*			
% National Rural Development Program allocated to the region	7.2	*8*			

Note: a: the value is the national share of the region, b: period of 2005-16. Data for ESPA and Rural Development Program were accessed on 3/12/2020 and 4/12/2020 respectively.
Sources: National Documentation Centre (2019), Ministry of Development and Investments (March 2020)

Public Investments and European Structural Funds in Western Macedonia

Public Investment Program

The Public Investment Program is one of the most powerful development policy tools available, supporting through its national and co-financed programs infrastructure, entrepreneurship and the development of human resources. At the same time, its regional allocation is considered an indication of the commitment of the State to regional cohesion and balanced growth. Western Macedonia receives 7% of the Public Investment national budget against a population share of 2.5% and a GDP share of 2.2%. As a result, the per capita figure is the highest in Greece (Table 13.9).

European Structural Funds

The allocation of the 2014-20 European Structural Funds is aligned to the economic characteristics of the region, as Western Macedonia receives 5.57% of the amount of ESPA allocated to Regional Operational Programs in Greece and 3.0% of the total amount of ESPA. Western Macedonia has also got 7.2% of the Rural Development Program (Common Agricultural Policy), a figure that is the eighth highest among the Greek regions and corresponds to the weight of the agricultural sector of the region (Table 13.9).

ESPA Regional Operational Program

The Regional Operational Program of the Region of Western Macedonia includes a Vision, 6 Strategic Objectives and 10 (out of 11) ESIF Thematic Objectives[81] that altogether define the development strategy of the Region. The development strategy, after a period of open consultation with regional stakeholders, is decided by the Regional Council of Western Macedonia, included in the programming documents of the ROP and finally approved by the European Commission. The Vision of the region of Western Macedonia is to 'contribute to the creation of a viable and competitive regional economy with sustainable jobs, quality environment and social cohesion'. The overall objective of this Regional Operational Program is to boost economic development and to create employment in the region of Western Macedonia. Furthermore, it seeks to support SMEs in order to enhance their competitiveness and to become more innovation-driven. Lastly, it also aims to reduce the emission of greenhouse gas while also focusing on increasing energy efficiency.

The strategic Objectives of the ROP are stemming from the 11 Thematic Objectives for the programming period 2014-20. Whence, they are tailored to the specific conditions of Western Macedonia so to ensure the ROP to be consistent and focused on existing regional development problems. They are:

- The improvement of business activity competitiveness with an emphasis on sectoral and sophisticated specialization through the Regional Intelligence Specialization Strategy (RIS3).
- The support for the transition to a low carbon economy and the promotion of climate change adaptation.
- The promotion of sustainable transport and the removal of bottlenecks in basic network infrastructures.
- Assurance of social cohesion and the promotion of sustainable employment.

The ROP of Western Macedonia is about 295 million euro, measured in terms of commitments to date, figure that includes EU funding and national co-funding (public expenditure). More than half of these funds address environmental (40.1%) and transport (13.1%) projects or actions, while an equally high share of resources is devoted to human resources development and protection (31.7%). A relatively smaller amount is available for actions in support of entrepreneurship (6.5%) and for research and technology (6.6%) (Table 13.10).

Compared to the share of total resources of the 13 ROPs in different policy priorities, the ROP of Western Macedonia assigns more resources to research and technology (138%) and environment (120%) and less to entrepreneurship (98%), human capital and social care (94%), and transport (73%).

The progress in the implementation of the ROP has been improving over the current year, reaching about 60.3% of the budget of ROP (by the beginning of December 2020) has been contracted for projects and actions and just 34.0% actually spent. The current progress, which is still below the national performance, signals that the worst performance in the implementation process in terms of spending is observed in the research and technology (3.6%) and the transport (12.7%) priorities, and the best in the human capital and social care (61.3%) (Table 13.10).

[81] The 11 Thematic Objectives of the ESIF 2014-20 are:: (1) strengthening research, technological development and innovation; (2) enhancing access to, and use and quality of, ICT; (3) enhancing the competitiveness of SMEs, of the agricultural sector (for the EAFRD) and of the fishery and aquaculture sector (for the EMFF); (4) supporting the shift towards a low-carbon economy in all sectors; (5) promoting climate change adaptation, risk prevention and management; (6) preserving and protecting the environment and promoting resource efficiency; (7) promoting sustainable transport and removing bottlenecks in key network infrastructures; (8) promoting sustainable and quality employment and supporting labour mobility; (9) promoting social inclusion, combating poverty and any discrimination; (10) investing in education, training and vocational training for skills and lifelong learning. Thematic objective (11) enhancing institutional capacity of public authorities and stakeholders and efficient public administration, is not included in the ROPs.

Table 13.10. Indicators for the Regional Operational Programs of the region of Western Macedonia

Indicator	Regional indicator							
	Level of Commitments (Public expenditure)	*National Rank*	National average = 100	Share of ROP contracted	*NA='100' (rank)*	Share of ROP implemented	*NA='100' (rank)*	
ROP total budget. (Public expenditure) (€), 2014-2020	294,446,136	*8*	5.57[a]	60.3	*69 (13)*	34.0	*77 (13)*	
% ROP in research and technology	6.6	*1*	147	32.7	*71 (9)*	3.6	*27 (9)*	
% ROP in entrepreneurship	6.5	*10*	80	43.2	*28 (13)*	27.4	*73 (10)*	
% ROP in human capital and social care	31.7	*11*	85	96.4	*92 (10)*	61.3	*107 (7)*	
% ROP in environment	40.1	*3*	130	56.4	*92 (6)*	26.3	*78 (10)*	
% ROP in transport	13.1	*10*	77	12.9	*16 (13)*	12.7	*29 (13)*	
% ROP in technical support	2.1	*5*	100	25.0	*46 (12)*	18.0	*52 (11)*	

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (3 December 2020)

ESPA Sectoral Operational Programs

The resources of the ROP are matched by the funds (about 638.6 million euros, counted in terms of total public expenditure for funding approved projects to date) allocated to Western Macedonia by the ESPA Sectoral Operational Programs (SOPs). The SOPs are managed in the 2014-20 programming period by the Ministry of Development and Investment (former Ministry of Economy and Development).[82] Table 13.11, shows that the SOPs of ESPA directed to Western Macedonia devote a relatively higher share to environment, and relatively close shares to human capital and entrepreneurship, lower ones to transport and research and technology. These programs also reserve some resources for the restructuring and modernization of public administration in Western Macedonia (1.6%).

[82] In previous programming periods, Sectoral Operational Programs were managed by line Ministries.

Table 13.11. Indicators for the Sectoral Operational Programs (SOP) allocated in the region of Western Macedonia

Indicator	Regional indicator						
	Allocated budget for funding approved projects (public expenditure)	*National Rank*	National average = 100	Share of SOP contracted	*NA='100' (rank)*	Share of SOP implemented	*NA='100' (rank)*
ESPA budget total (€), 2014-2020	638,570,470.74	*11*	2.51[a]	77.5	*105 (5)*	45.2	*117 (1)*
% ESPA in research and technology	9.3	*6*	94	47.7	*96 (7)*	23.6	*117 (2)*
% ESPA in entrepreneurship	22.3	*9*	84	96.4	*100 (9)*	52.2	*113 (2)*
% ESPA in human capital and social care	25.2	*6*	105	90.5	*97 (7)*	54.1	*107 (4)*
% ESPA in environment	28.5	*3*	113	53.8	*112 (4)*	26.1	*97 (8)*
% ESPA in transport	10.7	*4*	104	95.2	*162 (1)*	79.1	*213 (1)*
% ESPA in administration	1.6	*6*	102	68.6	*95 (10)*	33.5	*99 (9)*
% ESPA in technical support	2.5	*6*	93	88.1	*98 (12)*	54.0	*102 (4)*

Notes: a: the value is the national share of the region.
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Making the most of the EU Structural Funds: enhancing human capital, innovation and Smart Specialization

The policy mix in the area of skills and social protection is well represented by the combined allocation of funds in both the ROP of Western Macedonia and the SOPs. Table 13.12 shows that significant resources are available in the ROP for human capital and social inclusion (93 million euros). Most of these funds are addressing social inclusion actions (57 million euros), a minor share is for education and lifelong learning (34 million euros) and actions supporting employment (2.3 million euros). However, as it is shown in Table 13.13, education and employment actions are more strongly supported by the SOPs. The option to focus on social inclusion in the ROP is largely imposed by the crisis and the severity of problems faced by significant social groups. The expected impact of these actions is to improve access to services for the deprived and reduce social exclusion and poverty. The implementation of the social inclusion sub-program is relatively satisfactory, as the contracted share reaches 66.5% and payments 39.7% of the budget.

The ROP budget also reserves 19 million euros to Smart Specialization, an amount that mainly supports investment by SMEs in the fields identified by RIS3 as the most relevant for the development of the region. This action is has been contracted at 96.9%, and has reached payments to 61.5%. In addition to the funds

allocated in the ROP, Western Macedonia receives a significantly larger amount from the Sectoral Programs in these fields.

Table 13.12. The funds of the ROP of Western Macedonia for Skills, Innovation and Smart Specialization

	Committed Public Funds, €	Allocated Budget, €	Contracted, €	Contracted share of budget, %	Payments, €	Payments as a share of budget, %
Skills	93,339,803.00	149,428,732	89,953,469	60.2	57,248,932	38.3
Employment	2,259,423.00	770,419	0	0.0	0	0.0
Education and Lifelong Learning	34,217,543.00	64,000,002	33,625,102	52.5	23,673,649	37.0
Social Inclusion	56,862,837.00	84,658,311	56,328,367	66.5	33,575,282.46	39.7
Innovation	19,425,668.00	10,818,159	6,361,831	58.8	698,971	6.5
Research Technology Innovation	9,712,834.00	10,818,159	6,361,831	58.8	698,971	6.5
Information and Communication Technologies	9,712,834.00	0	0	-	0	-
Smart Specialization	19,138,503.00	8,525,073	8,259,154	96.9	5,244,316	61.5
SME's Competitiveness	19,138,503.00	8,525,073	8,259,154	96.9	5,244,316	61.5

Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Table 13.13 shows that Western Macedonia is estimated to receive from the respective SOPs additional 161 million euros for human capital and social inclusion, 59.7 million euros for Innovation and 142 million euros for Smart Specialization. This means that the regional strategy, as defined in the ROP, gets strong support from the sectoral programs. The policy mix in the SOPs is focused more on employment and lifelong learning and very little on social protection, as the later has been implemented at the regional and local level in a more place-based approach. Implementation of the sectoral skills programs is relatively satisfactory, as 90.5% of the allocated budget has been contracted and 54.1% spent.

In addition, the analysis of the programming and implementation figures that the SOPs devote significant funds on innovation and ICT that have relatively low degree of contracting (47.7%), but an even lower spending (23.6%).

The gap between contracting and spending is explained by a number of factors. Most common factors are (i) the late start of the programs (most of them launched in 2017), (ii) cumbersome administrative procedures, (iii) but also the actual time that an R&D or innovation project needs in order to be completed. The total amount of funding indicates that innovation policies are mainly supported by the SOPs where the budget is much higher. However, it is worth to consider the main part of the budget in these programs is directed to ICT infrastructure.

Finally, the funds allocated to Smart Specialization are mostly business development funds concentrated in the sectors identified in the RIS3 as the most important for the region. They have a significant budget that reached almost total in contracted amount (96.4%), but payments are still relatively low (52.2%). One of the reasons for the slow implementation of the investment projects is the weak banking sector. Most investors face difficulties to get a loan or a guarantee from their banks, as a consequence they have to complete their investment with their own financial means.

The experience from the design and implementation of Structural Funds with respect to skills, innovation and smart specialization indicates that there are some issues to address in policy design and implementation. First, the sub-program for Research and Technology in the ROP not being activated yet possibly indicates bottlenecks, related to the implementation of the program, that need to be addressed. Although the majority of the stakeholders considers the design of the RIS3 quite satisfactory, it is not implemented in time and according to the plan.

The second issue is related to the level of funding in the ROP. The most important development opportunities in the region are the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, as well the development of clusters and value chains of local export oriented firms. To seize these opportunities, investments in R&D and innovation policies are required and a significant part of these policies has to be place-based. According to the findings of the survey, the structural funds would have a greater impact on the regional economy if more emphasis were placed on cooperation between the region's productive and scientific base on innovative actions promoting smart specialization.

Table 13.13. The funds of the SOP for Skills, Innovation and Smart Specialization allocated to Western Macedonia

	Committed Public Funds*	Allocated Budget, €	Contracted, €	Contracted as a share of allocated Budget, %	Payments, €	Payments as a share of allocated Budget, %
Skills		160,631,196	145,357,230	90.5	86,951,565	54.1
Employment		87,153,212	69,150,777	79.3	46,897,897	53.8
Education and Lifelong Learning		63,901,592	66,764,137	104.5	31,194,242	48.8
Social Inclusion		9,576,392	9,442,316	98.6	8,859,426.00	92.5
Innovation		59,669,075	28,457,131	47.7	14,058,788	23.6
Research Technology Innovation		16,281,517	5,639,452	34.6	3,032,883	18.6
Information and Communication Technologies		43,387,558	22,817,679	52.6	11,025,905	25.4
Smart Specialization		142,322,486	137,244,531	96.4	74,352,261	52.2
SME's Competitiveness		142,322,486	137,244,531	96.4	74,352,261	52.2

Note: *There is no predefined commitment for each region
Source: Ministry of Development and Investments (2020) data accessed on 3/12/2020

Policy challenges to improve smart specialisation fostering skills and innovation

As described in previous sections, Western Macedonia is the 10th largest regional economy in Greece characterized by a low level of development compared to the national and the EU average and a high rate of unemployment. The economy of Western Macedonia is based on the presence of a significant primary sector, a strong secondary sector, which is facing urgent restructuring challenges and a large tertiary sector. The Primary sector relies on the agro-food industry and exhibits high levels of relative productivity. The secondary sector is mainly, based on coal power plants, with high levels of relative productivity. The tertiary sector is mainly based on public administration and defence, and exhibits low levels of relative productivity. Western Macedonia faces the challenge to prepare the transition to the post-lignite era, putting emphasis to enrich its economic base with new industrial activities (Box 13.1). This study identifies opportunities in three main areas for Western Macedonia to seize its decarbonisation process and foster economic development and employment:

1. Strengthening and diversifying the productive base of the regional economy.
2. Pursuing an innovation-oriented and knowledge-intensive regional society.
3. Enhancing the performance and impact of EU Structural Funds.

Box 13.1. The challenge of decarbonisation and the transition to clean energy of Western Macedonia

Greece produces high greenhouse gas emissions- 9.2 tons per capita every year, compared to 8.8 tons per capita at EU level. This is mainly due to fossil fuel dependency, with more than 30% of electricity generated from lignite in the two lignite mining areas (the Western Macedonia region and the Megalopolis area in the Peloponnesus region), and close to 10% generated by heavy oil or diesel on the islands.

While 6 out of 11 Greek regions produce 30% or more of their electricity using renewables, Western Macedonia, which generate together with Peloponnese 45% of Greek electricity, still largely rely on coal for electricity generation. In 2017, these two regions used coal-fire power for at least one quarter of their electricity production. In contrast, Central Greece –which is the second largest producer of electricity in the country – has made important progress in the transition to clean electricity. In 2017, 36% of Central Greece's electricity production came from renewable sources.

In its revised National Energy and Climate Plan, the Greek government has committed itself to the full closure of the lignite sector by 2028. To this aim, an Intergovernmental Committee was set up in 2019 to promote the fair transition in the regions in reference. This presents a huge challenge in terms of transforming the Western Macedonia economy from its near to complete lignite dependency to other, diversified economic activities.

In the region of Western Macedonia, notably in the Kozani prefecture where the largest mines and most power plants are located, lignite-based electricity production is the most important economic sector, accounting for over one third of regional GDP. Therefore, while closing down the lignite sector will have positive environmental and health impacts, it poses significant economic and social challenges. An estimated 5,500 jobs in the lignite mines and power plants are directly at risk. An additional 20,000 jobs are indirectly at risk. At 31% (2016), the region already has one of the highest unemployment rates of all EU coal/lignite regions, and its GDP/capita collapsed from 86% to 59% of the EU average between 2009 and 2017. Furthermore, over 100,000 inhabitants are connected to district heating systems, which function with the residual heat of the lignite-fuelled power plants. The environmental rehabilitation and repurposing of the mining areas is another important challenge to address, taking into account the "polluter pays" principle.

Source: OECD Regions and cities at a glance 2020 (country note Greece). European Commission 2020 country reports: Overview of Investments guidance on the Just Transition Fund 2021-27 per member states (Annex D - Greece). Greece's Just Transition Development Plan of lignite areas (18 September 2020).

Strengthening and diversifying the productive base of the regional economy

Western Macedonia specializes in mining and quarrying and in labour-intensive manufacturing, and it has modestly diversified economic base. Western Macedonia lags behind in innovative activities, lacks significant value chains, and is characterized by limited export and low regional multipliers. To tackle these transition-related challenges in Western Macedonia, priority investment needs to be targeted at diversifying the regional economy and making it more modern and competitive. Key to the latter should be the sectors identified in the region's regional innovation strategy, namely: (i) agro-food; (ii) environment and energy;

(iii) the luxury clothing industry; and (iv) tourism, in particular agro-tourism. The energy component of such a new regional model would concern the development of hydroelectricity, other local renewables and energy storage solutions in relation to renewables.[83]

Accordingly, targeted policy interventions should support actions to:

1. Support the transformation and diversification of the primary sector towards quality and organic products and development of a new agro-food sector that exports to specialized and high-income markets.
2. Develop a regional incentives framework that is going to include contracts for the provision of municipal land and services and local support mechanisms to attract large investments, of domestic or international origin, in sectors that can benefit from the region's advantages and operate in addition to its production fabric.
3. Develop start-ups in the fields of ICTs, bio-food, bio-health, agrotechnology, social economy, circular economy or other cutting-edge industries with the support and cooperation of Research Laboratories, Incubators and Entrepreneurship and Innovation Canters.
4. Support the development of new industrial sectors in which the region can develop a comparative advantage based on a development plan that seeks to diversify the production base through targeted and coordinated policies at the local and regional level.
5. Develop the energy sector through investments in renewable projects, such as solar, wind, hydroelectric and local energy networks, that are going to reduce energy costs in production and make the region a more attractive investment destination.
6. Support the regeneration and decontamination of sites, land restoration and repurposing projects.
7. Upskill and reskill workers and provide job-search assistance to jobseekers.

Pursuing an innovation-oriented and knowledge-intensive regional society

Overall, Western Macedonia faces significant challenges in terms of improving the innovative capacity of its productive sector. Despite the fact that the performance of Western Macedonia in terms of innovation indicators improved during the last decade, the region has, still, big margin for improvement under many aspects, e.g. the need to be more business-driven. Nevertheless, the current ROP of Western Macedonia allocates a relatively small amount of funds for R&D and innovation actions (approximately 19.5 million euros), whose implementation, in addition, is experiencing a serious delay.

The more active engagement of the University of Western Macedonia in applied and locally focused research can be the base for knowledge-based local innovation activities. This is a necessary requirement for catching up, as the productive system of Western Macedonia is lagging behind in terms of innovation capacities compared to Attica, which accounts for more R&D expenditures than all the other Greek regions put together (EC, 2019).

Western Macedonia needs to embark on a recovery and growth process that will be more knowledge-intensive than in the past. Although there are some encouraging signals, such as the increasing number of business that cooperate with the University in research projects, this remains a critical challenge for the near future. The analysis has shown that significant obstacles exist that need to be addressed in an effective way. On the positive side, in the current programming period RIS3 is, to some extent, a well-funded and well-targeted strategy. This major improvement already resulted in the relevant scoreboard

[83] European Commission 2020 country reports: Overview of Investments guidance on the Just Transition Fund 2021-27 per member states (Annex D - Greece). Greece's Just Transition Development Plan of lignite areas (18 September 2020.

indicators. However, RIS3, which in Greece is mostly operated at the national level, with 87% of the funds (EC, 2019), needs to re-innovate the role of the regions.

Targeted policy intervention should support actions to:

1. Foster cooperation and collaboration between the key actors of the regional innovation ecosystem. Western Macedonia needs to build further on the existing experience of the administration, the University, the Regional Research Council, the public and especially the private stakeholders, in order to develop a more effective policy framework in the next programming period.
2. Address the issue of 'ownership' of the RIS3 and at the same time handle the implementation of the R&D programs in a way that enables the accumulation of innovation-specific knowledge and policy capabilities within the regional R&D community. Western Macedonia needs to better tune the regional Smart Specialization Strategy, so to make projects and actions more relevant to the real needs and opportunities of the region.
3. Enhance the business-academy collaboration in Western Macedonia, making a better use of the available funds for industrial research and innovation. This can be caught-up by building on the experience of these actors (especially the University, but also some businesses) in successfully applying to the calls of the SOPs and engaging in the joint implementation with private firms of a large number of projects.

Enhancing the performance and impact of EU Structural Funds

The region receives significant financial support from Structural Funds, whose potential is not fully exploited because of the average modest progress in the implementation of the Regional Development Program (ROP) and to some extend also of the Sectoral Operational Programs (SOPs), even considering the substantial progress made in 2020. The coexistence of the SOPs and the ROP to serve the development needs of the region raises the twofold issue of ensuring complementarity of programs, measures and actions, and of defining the most appropriate level of administration for each type of intervention. In general, the centrally-implemented SOPs' projects are complementary to the corresponding ROP's projects, in the sense that they do not cover the same type of actions. This regards Thematic Objective 4 (supporting the shift towards a low-carbon economy in all sectors), Thematic Objective 6 (preserving and protecting the environment and promoting resource efficiency), and Thematic Objective 9 (promoting social inclusion, combating poverty and any discrimination). In contrast, the centrally-implemented SOPs' projects retain a competing relation with the ROP'S projects as regards Thematic Objective 1 (strengthening research, technological development and innovation), and Thematic Objective 3 (enhancing the competitiveness of SMEs), overlapping either because the calls were contemporarily open or because they support similar actions.

To enhance the overall performance and impact of the Structural Funds in Western Macedonia, policy intervention should support actions to:

1. Strengthen the regional and local management system for the implementation of the ROP in order to speed up and exploit full steam the sub-program for Research and Technology in the ROP that are not being activated yet. To be noted that many interviewed stakeholders consider the design of the RIS3 quite satisfactory, but not implemented timely according to the plan and the business needs.
2. Better focus the ROP financial intervention targeting support on the production of high-quality products, the development of a strong science base and the development of new start-ups in ICT, bio-food and agro-tech, and the development of clusters and value chains of local export-oriented firms.
3. Pursue a rebalance in the responsibility over the implementation of the projects funded in the region from the central bodies to the Regional Authority in order to improve their impact. For example, by

incorporating in the ROP all the place-specific projects and actions implemented in the region, while horizontal projects or actions or inter-regional programs could be better implemented through centrally-run SOPs.

4. Ensure a greater impact of the ROP on the regional economy by aligning it with the regional and spatial plan.

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