JRC TECHNICAL REPORT

Higher Education for Smart Specialisation:

The Case of Eastern Macedonia and Thrace

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Abstract

This technical report presents the findings of the case study carried out in Eastern Macedonia and Thrace on the role of Higher Education Institutions (HEIs) in the design and implementation of the Smart Specialisation Strategy (RIS3). It is one of the case studies undertaken in the project Higher Education for Smart Specialisation (HESS), an initiative of the European Commission's Joint Research Centre (JRC) and the Directorate General for Education, Youth, Sport and Culture.

The region is a moderate innovator according to the 2019 Regional Innovation Scoreboard, with important structural weaknesses constrained by horizontal development policies, suffering from its remoteness which affects to its ability to attract and retain talent. It has a comprehensive higher education system, with the Democritus University of Thrace as main regional higher education institution and eleven campuses spread across the Region.

The Smart Specialisation Strategy is considered by stakeholders the best available tool to develop a long-term, evidence and place-based regional innovation strategy. The regional and national governance structures and their interaction, as well as the policy mix deployed for the programming period 2014-2020, has limited the capacity of higher education to contribute to regional growth. The partnership between regional administration and HEIs manager seems to have room for improvement, through spaces for dialogue and the co-design of funding instruments that respond to a shared vision of regional challenges. The institutionalisation of HEI third mission could benefit from a performance based type system, as well as the promotion of HEI leadership in a region characterise by a strong disconnect.

The new programming period 2021-2027 is an excellent opportunity to strengthen the ambition of the higher education institutions to lead the regional transformation process, through adequately tailored funding instruments and improved peer learning capacity from good practices at EU level

Summary

The Eastern Macedonia and Thrace region was selected as a case study for the European Commission project on Higher Education for Smart Specialisation (HESS) in 2019, promoted in partnership between the Joint Research Centre and Regional Research and Innovation Council. Supported by DG Education, Youth, Culture and Sport, the HESS project is implemented by the Joint Research Centre (JRC) in Seville. The project aims to understand how Higher Education Institutions (HEIs) can play a more effective role in the design and implementation of Smart Specialisation Strategies (S3), while helping to build partnerships with the regional authorities responsible for these strategies.

The case study aimed to ensure the regional debate on the role of HEIs in implementing S3, with four main objectives:

1. To determine the objectives and motives for HEIs/PROs to contribute to the regional S3
2. To establish suitable effectiveness criteria for HEI/PRO contributions to the regional S3
3. To establish the extent to which the above effectiveness criteria have been met;
4. To determine the factors associated with the effectiveness of HEIs/PROs contribution to S3 and to understand whether some of those factors are more influential than others

The case study was launched in January 2020 with the organisation of the exploratory meeting in which a first discussion between the Regional Research and Innovation Council, the Managing Authority of the Regional Operational Programme, higher education institutions and the European Commission Joint Research Centre took place to explain the aims of the HESS case study, understand the regional context and identify the main challenges for higher education to engage regionally. Other HESS case studies have been addressed at regional and national level. In the previous HESS project phases, the selected regions included Navarra (Spain), North East Romania, Centre Val Loire (France), Puglia (Italy) and North Central Bulgaria. In the current phase of HESS, four more regions were selected as case studies in addition to the Eastern Macedonia and Thrace one: Lubelskie (Poland), Lower Austria and Northern Netherlands. In addition, two national cases studies have been selected, namely Lithuania and Portugal.

Method

The case study has adopted the action research¨ methodological approach, mobilising the main research actors in the region affected by the study, driven by a joint reflection on the main regional challenges and identification of potential actions to address them.

The main methodological tools that used in the case study include:

- Exploratory meeting to understand the regional context and challenges related to HE engagement
- Desk research to analyse the main S3 and HEIs context in Eastern Macedonia and Thrace
- Fieldwork research including bilateral interviews with 12 experts
- Final workshop that took place in February 2021

Regional context

The region is a moderate innovator according to the Regional Innovation Scoreboard, ranked with the higher education sector as main contributor to the total R&D personnel in the region, which has suffered however from a marked decline since 2013 (Eurostat, 2020). The region has a comprehensive higher education system, with the Democritus University of Thrace as the one regional university and six campuses spread across the Region, which does not seem to be supported by a strong academic or research rationale.

The Smart Specialisation Strategy 2014-2020 in Greece has adopted a hybrid model that comprises a national and 13 regional S3s, developed by the General Secretariat for Public Investments of the Ministry of Development which coordinates the Managing Authorities of all ESIF-funded OPs. It has assumed the role of S3 Management Team for the national S3, however there are no such entities at the regional level.

Main results and policy recommendations

The persistent problem of how the regional higher education institutions can contribute to raising regional competitiveness and to developing a more sustainable and inclusive society remains current. Whilst regional policy actors see HEIs as being critical for the delivery of their regional innovation goals, HEIs themselves do not necessarily see the region as vital for their own survival. HEIs in Greece face many challenges in competing to attract talented faculty, researchers and students, to get highly competitive research funding

and to address their infrastructure needs and operational expenses with ever-declining budgets of institutional funding. The legal framework for HEIs neither encourages nor rewards regional engagement activities, considered to be less rigorous and less worthy than excellent research.

The regional HEIs/PROs participated in the design of the regional S3, making sure that the regional ESIF budget allocation would serve their urgent needs for infrastructure and grasping research project funding opportunities. However, once priorities and budgets were decided, and the first calls were launched, their interest in the governance of the regional S3 declined.

The main findings related the case study questions are the following:

1. Effectiveness criteria for HEI/PRO contributions to the regional S3

The local HEIs/PROs were rather successful in participating in nation-wide collaborative research projects and in regional contract research projects and very successful in national research infrastructures. However, none of the regional HEIs are central in the networks, meaning that regional enterprises tend to seek extra-regional scientific expertise to source knowledge. Both regional HEIs attract students from all over Greece and they cannot be characterized as regional from this perspective. Despite their efforts, the regional HEIs are losing the battle of talent attraction at all fronts, due to the remoteness of the region

2. Factors influencing the effectiveness of HEIs/PROs contribution to S3

External / Contextual factors: the region is mostly unattractive border region suffering from its remoteness, which affects its ability to attract and retain talent, limiting its influence on the major decision-making centres and inhibiting competitive access to global knowledge and trade networks. The means available to the Region to reverse its long-term structural weaknesses are constrained by the horizontal development policies designed at the national level. Even the HEIs 'third mission' is by national law part of their mission, there is no evidence this objective is addressed in HEI performance reviews, funding criteria and faculty hiring/ promotion. REMTh's overdependence on low-tech/low-productivity sectors affects the propensity of the majority of regional businesses to engage with HEIs in a proactive manner, despite the relevant disciplines supported by the regional HEIs.

Financial factors: The majority of the policy instruments that were available to the Region for smart growth and for skills/training are designed and managed at the national level, thus not being tailored to the regional needs and to the regional context. The severe fiscal limitations of the period between 2008 and 2018 have affected all aspects of non-core HEI activities and infrastructure, including maintaining faculty and administrative jobs that remained vacant when staff retired.

Organisational factors: the regional government is rather weak in formulating a clear regional development vision and pursue its achievement by mobilising other regional actors to formulate effective strategies or influence decision making at a national level, and ensure coordination between national 'top down' and local 'bottom up' policies. The region could greatly benefit from a stronger leadership of HEIs, which lack a strong central management to define a vision and strategy for the development of the HEIs and their role in regional development. The DUTH, major regional HEI, has elaborated a research strategy closely related to the 'third mission', but it is unclear if the investments in organizational structures would create concrete results.

Human resource related factors: the HEI inability to hire qualified personnel in the region to support mission-critical organisational departments is a direct result of the region's geographic position and unattractiveness. Funding schemes such as Industrial PhDs or introducing in the curricula collaborative projects based on challenges for students can be an interesting mechanism. Additional incentives could be created by the region and the HEIs for the promotion of faculty members to improve the performance in competitive EU funding.

As a conclusion, the HEI third mission should be institutionalised, probably through a performance based type system. The partnership between regional administration and HEIs manager seems to have important room for improvement, through spaces for dialogue to agree in main regional challenges. The regional S3 would benefit from a more clear mandate to the Regional Research and Innovation Councils, and the reinforcement of skills for EU funds management within the regional administration. In addition, the DUTH should increase ambition to lead the regional transformation process, benefiting among others from EU initiatives, such as the HEInnovate, Erasmus+ Knowledge Alliances or EIT-KICs, to better connect HE to the regional ecosystems.

The S3 is still the best available tool to develop long-term, evidence and place-based development strategies. However, the policy instruments that support university-industry collaboration should be expanded and adapted to the regional context, particularly in view of the discussions for the 2021-2027 European Regional Development Funds Operational Programmes.

1 Introduction

This report presents the results of the pilot case study of the Region of Eastern Macedonia and Thrace region in the context of Higher Education for Smart Specialisation project, managed by the European Commission Joint Research Centre in partnership with the Directorate General of Education, Youth, Sports and Culture.

The HESS project aim is to analyse how higher education can be better integrated into S3 policy mixes and how the European Structural and Investment (ESI) funds can be more effectively spent in this field. Furthermore, the project aims to explore how institutional capacity in Europe's regions can be built by strengthening the role of HEIs within the 'quadruple helix' of government, academia, business and civil society.

The case study was launched in late 2019 by the European Commission's JRC with the overall aim to generate knowledge and support the Region in reinforcing the role of Higher Education in S3 and promoting the integration of Higher Education Institutions (HEIs) and Public Research Organisations (PROs) with research, innovation and regional development in S3 policy mixes, particularly through the use of European Structural and Investment (ESI) Funds.

The Eastern Macedonia-Thrace case study has addressed four specific research questions, namely:

- To determine the objectives and motives for HEIs/PROs to contribute to the regional S3;
- To establish suitable effectiveness criteria for HEI/PRO contributions to the regional S3;
- To establish the extent to which the above effectiveness criteria have been met;
- To determine the factors associated with the effectiveness of HEIs/PROs contribution to S3 and to understand whether some of those factors are more influential than others.

The methodology of the case study has been deployed in six phases:

1. An exploratory meeting where the JRC, and representatives of HEIs/PROs, the regional government and the Regional Research and Innovation discussed the engagement of universities in S3 and the main challenges faced in building a broader role for universities.
2. A background desk research to collect, process and contextualise evidence on the engagement of regional HEIs/PROs in S3 since 2014.
3. A series of in-depth interviews with HEI managers, HEI faculty, businesspersons, the Regional Managing Authority, and the Regional Research and Innovation Council to collect feedback on the findings of the desk research.
4. An analysis of the outcomes of the interviews and desk-research to extract main key findings.
5. A final event in which the results of the case study were presented and discussed among participants, with the opportunity to identify potential ways forward to strengthen the role of higher education in regional growth through the use of European Regional Development Funds in view of the programming period 2021-2027
6. An analysis of the overall findings from the interviews and final workshop, and the drawing of final conclusions, policy implications and recommendations provided in this JRC Technical Report

The rest of the report is organised in seven main sections. In addition to the current introduction, Section 2 explains in detail the methodological approach followed in the case study. Section 3 gives an overview of the regional economic development context. Section 4 discusses the Greek context for Higher Education and with a focus on HEIs' third mission. Section 5 discusses the national and the regional S3s and the role, so far, of the regional HEIs/PROs in their respective lifecycles. Section 6 describes the results of the interviews and finally, Section 7 provides the conclusions of the entire case study and provides policy recommendations.

2 The HESS Eastern Macedonia and Thrace case study: Methodology

To understand the context of participation of HEIs/PROs in the regional S3, background research was performed to understand REMTh S3 specificities in the broader context of the hybrid setting of smart specialisation in Greece consisting of one national and thirteen regional strategies running in parallel, the regional and national governance structures and their interaction, and the policy mix deployed for the programming period 2014-2020. The general context of higher education in REMTh and in relation to the overall national framework was presented and critically discussed from the perspective of S3 in general, and the focus of this case study (third mission, provision of territory-specific skills). The background research was based on secondary sources that are publicly available, such as OP texts and reports, laws, S3 documents and official statistics.

Understanding the objectives for HEIs/PROs contribution to the regional S3 is a key question that must be answered before providing insights on how to integrate such institutions in the regional S3. The incentive structure of both HEIs/PROs senior management and faculty members that participated as individuals at all stages of the S3 process has to be understood (Edwards & Marinelli, 2018, p. 34) and its evolution over time to be estimated. A clear distinction between altruism to support a place-based transformation agenda versus pure institutional or individual motives had to be made. Answers were sought through semi-structured interviews with selected key HEIs/PROs senior management and staff that participated in all stages of the regional S3. Validation was performed by asking the opinion of peers from the government and the enterprise sectors to verify the objectives and motives, and moreover, to describe what these stakeholders expected from HEIs/PROs in the S3 process.

To discuss effectiveness in the context of HEIs participation in a regional S3, we first needed to define expected contributions. Kempton et al. (2013) describes five areas where HEIs can contribute in the context of a regional S3 (leadership, promoting collaborations, creating absorptive capacity, establishing linkages to other relevant knowledge sources, promotion of policy learning) and provides examples of contribution for each area. Goddard (2011) examines the four mechanisms by which HEIs can contribute to regional development and makes a distinction between transactional versus transformative interventions. The combination of the above provided an ideal model that was used as the basis for establishing not only the expected contributions but also their expected impact for the regional economy.

To establish the extent to which the above effectiveness criteria have been met, we had to rely on both quantitative and qualitative research. For the qualitative part, we have adapted and extended the instrument used by Campillo et al. (2017) for the Navarre HESS report to improve the granularity of the questions and determine the influencing factors. The quantitative research addressed both actual contributions in the S3 (such as project budgets for Thematic Objectives 1 and 10, collaboration networks of HEIs with other actors, evidence of HEI contributions in S3 governance) and enabling factors (such as the HEI internal governance dimensions proposed by Arregui Pabollet, Doussineau, & Dettenhofer (2018). Most of the quantitative data for this part of the research were provided from the national and regional Managing Authorities (calls, proposal, and project data).

2.1 Exploratory workshop

The author, in discussion with competent public authorities and JRC team, helped shape an initial set of research questions for the case study, based on the main challenges addressed in the region in terms of S3 implementation and engagement of HEIs. The stakeholders suggested that there is considerable potential for further engagement of the regional HEIs and PROs in the regional RIS3 of Eastern Macedonia and Thrace, both in terms of strategy development and in terms of implementation and creation of impact. They considered the HESS project as an opportunity to re-introduce the transformative role of HEI/PROs in shaping place-based development strategies, re-initiate the stakeholder dialogue, realign the individual development

visions, bring to light issues that inhibited performance and thus eventually address them. Two provisional research questions were proposed:

1. To what extent was the contribution of the Regional HEI/PROs in the regional S3 effective and efficient?
2. To what extent did the framework conditions, including governance arrangements, affect the above contribution?

The framing of the case study was finalised after an exploratory meeting with the author, representatives of the region, HE stakeholders and JRC staff that was held in Komotini, the regional capital, on 27 February 2020. During the exploratory meeting stakeholders emphasized that the HEIs third mission should be the core objective of this HESS project, interregional collaboration in S3-related projects should be examined and opportunities for interregional networking to support regional S3 should be identified.

2.2 Research objectives

By considering the feedback during the exploratory workshop, the research objectives of the REMTh case study were reformulated as follows:

1. To determine the objectives and motives for HEIs/PROs to contribute to the regional S3
2. To establish suitable effectiveness criteria for HEI/PRO contributions to the regional S3
3. To establish the extent to which the above effectiveness criteria have been met;
4. To determine the factors associated with the effectiveness of HEIs/PROs contribution to S3 and to understand whether some of those factors are more influential than others.

2.3 Semi-structured interviews

The fieldwork component was based on an open-ended research instrument to capture qualitative data from the stakeholders. JRC asked the Regional Research and Innovation Council (RRIC) for their support in conducting the field research and specifically to propose a list of stakeholders to be interviewed by the author. The RRIC chair proposed that JRC should contact the two Regional HEIs and ask for a list of candidate interviewees and offered to provide an additional list of candidate interviewees from the Regional Administration, the Managing Authority, the regional enterprises and other RRIC members. Following this procedure, the list of interview candidates was finalised on 29 May 2020, with the RRIC's proposal of three entrepreneurs.

In addition to the above, the author contacted Ms Panagiota Galiatsatou, an independent researcher and member of the RRIC for an interview but did not receive any answer. Another businessperson was proposed by a HEI faculty member and accepted the invitation to be interviewed. Table 1 summarises the participants in the field survey.

Table 1 Field survey participants

Stakeholder type	*Proposed by the regional stakeholders*	*Contacted by the author*	*Interviewed*
HEI Administration	2	0	1
HEI Faculty	10	0	4
Business sector	3	1	2
Regional Government	2	0	2
RRIC	2	1	2
Total	**19**	**2**	**11**

The interviews were conducted between 29 May and 24 July 2020 starting with the Regional Government, then HEI faculty and businesses, then the RRIC and closing with HEI Administrators. All interviewees received the background document and the list of questions at least one week before the interview so that they could prepare. All interviews with one exception were conducted through Skype. The average interview duration was 90 minutes.

2.4 Final workshop

The workshop was organised in February 2021 in collaboration between the Regional Research and Innovation Council of Eastern Macedonia and Thrace, the Ministry of Education and Ministry of Development and Investment of Greece, the European Commission, OECD, higher education institutions and other research and innovation stakeholders at regional, national and international level.

It provided the opportunity to discuss how HEIs are contributing to the implementation of Smart Specialisation Strategy (S3), based on the results of the case study in Eastern Macedonia and Thrace, looking to ways forward for a more effective contribution of higher education to regional growth.

The workshop had two main objectives:

- To present and discuss the main findings of the HESS Eastern Macedonia and Thrace case
- To identify potential opportunities and actions that can be taken in the context of the 2021-2027 European Regional Development Funds (ERDF) and Cohesion Funds (CF), particularly in view of the novel introduction of the ¨Skills for Smart Specialisation, industrial transition and entrepreneurship¨ under the Smarter Europe policy objective.

The Higher Education institutions benefited from the experience built on Higher Education for Smart Specialisation project and particularly the case study in Eastern Macedonia and Thrace, as well as the example from the Northern Netherlands experience. It allowed participants to exchange on ways to move forward on the better use of ERDF and Cohesion Funds in the context of Smart Specialisation Strategies.

In addition, during the workshop the participants had the opportunity to learn from the HEInnovate initiative and the ongoing HEInnovate Greece Country Review. The HEInnovate initiative is managed by the European Commission DG Education, Youth, Sports and Culture and the OECD, and supports the entrepreneurial and innovative potential of higher education institutions, through a wide range of tools and activities, which goes from a self-assessment tool, train the trainers activities, training materials and events.

Among the HEInnovate community of practice, so far 20 Greek HEIs have used HEInnovate (with 105 self-assessments completed). Within the Greece Country review 90% of Greek HEIs are actively engaged, with a particular focus on Entrepreneurial teaching and learning, The internationalized institution, Digital transformation and Knowledge exchange and collaboration.

The National Strategy for Research, Technological Development and Innovation for the period 2021-2027 will focus on research and innovation investments aiming at increasing the competitiveness of the Greek economy and tackling important social problems. The strategy will be focused on three pillars: 1) Investment in Innovation, 2) Research Excellence and Capacity, 3) Societal Challenges, Science and Society, Policy Support, with a horizontal dimension on Internationalization and Integration into Global Value Chains. In Pillar 1, focus will go into Collaborative Projects to support to industrial research and experimental development in business firms, Long – term, Strategic Partnerships and Co-creation Spaces, Competence Centres and Support to technology transfer offices. Pillar 2 will focus in Human potential development, with initiatives to reverse brain drain, combat brain waste, incentives for industry-academia mobility of researchers or support to research excellence will be at the core. Finally, Pillar 3 will be devoted to support Grand Societal Challenges (Health, Climate Change, Food Resilience).

3 Overview of the regional economic development context

The region of Eastern Macedonia and Thrace is in the northeastern part of Greece. It is one of the most industrialised regions in Greece, characterised by the highest share of primary sector, with a manufacturing sector primarily dominated by medium to low technology sectors but with some technology-intensive industries (chemicals, manufacturing machinery and industry) (REMTh, 2015).

The region is a moderate innovator according to the Regional Innovation Scoreboard, with a relative strength compared to the EU in non-R&D expenditure and weakness in the R&I expenditure by the private sector (European Commission, 2019). The higher education sector constitutes by large the main contributor to the total R&D personnel in the region, with almost 71% of the FTE researchers and total intramural gross domestic expenditure on R&D (Eurostat, 2020). However, the higher education sector has suffered a marked decline of 38% of employed researchers' headcount since 2013, and the business sector R&I expenditure as a percentage of GDP (0.21) which remains considerably lower than Greece average (0.55) and EU average (2.09) (Eurostat, 2020).

Table 2 presents the evolution of a series of context indicators at the regional, the national and the European level and compares the differences since 2013, i.e. the end of the previous programming period. Overall, although REMTH seems to be in a better position in most indicators since 2013, it has not managed to reignite its economy and follow the national trends (2.3% increase in GDP vs 4.24% at the national level, 3.47% vs 4.24% for GDP/capita, respectively).

Table 2 Key context indicators

Indicator	*REMTH (EL51)*		*Greece*		*EU28*	
	2013	*Latest*	*2013*	*Latest*	*2013*	*Latest*
GDP at current prices, mil EUR	7 004	7 165	180 654	184 713	13 615 092	15 907 594
GDP per capita at current prices, EUR	11 500	11 900	16 500	17 200	26 800	31 000
Population (thousand)						
Total	610	599	11 003	10 724	505 163	513 471
Aged 15 to 64	387	378	7 180	6 824	334 153	330 962
Employment, all NACE activities, thousand	187.2	212.9	3 508	3 832	215 521	229 715
Employment in technology and knowledge-intensive sectors, % of total employment						
High-tech sectors	1.1	0.6	2.4	2.8	3.9	4.1
High-tech manufacturing	-	-	0.4	0.5	1.1	1.3
Low-tech manufacturing	4.9	4.5	5.6	5.6	5.6	5.4
Manufacturing	8.0	9.0	9.2	9.4	15.4	15.4
Knowledge-intensive HT Serv.	1.0	-	2.0	2.2	2.8	3.0
Total services	55.4	61.6	70.8	72.5	70.5	71.4
Human Resources in Science and Technology						
Persons with tertiary education, thousand						
Persons with tertiary education, % of active population	67	87	1 819	2 057	90 304	102 951
Persons with tertiary education and employed in Science and Technology, thousand	21.3	28.1	30.4	34.5	30.4	34.1
Total R&D personnel by sectors of performance. Researchers (FTEs)	28	33	782	874	46 575	53 667
All Sectors	1 338	1 195	29 228	35 000	1 737 710	1 999 879
Higher Education	1 201	847	18 957	17 853	682 875	749 070
Business	50	250	4 197	9 660	829 869	1 027 510
Government	85	96	5 778	7 184	211 046	206 221
Total R&D personnel by sectors of performance. Researchers (Headcount)						
All Sectors	2 606	1 991	53 744	61 616	2 713 637	3 103 137
Higher Education	2 379	1 477	38 724	29 445	1 379 709	1 427 129
Business	96	330	6 004	15 671	1 047 836	1 324 941
Government	126	180	8 567	15 987	267 201	283 210
Total intramural R&D expenditure (GERD);						
Percentage of GDP	0.62	0.71	0.81	1.13	2.01	2.08
Higher Education	0.33	0.43	0.30	0.32	0.47	0.46
Business Sector	0.14	0.21	0.27	0,55	1.28	1,37
Government Sector	0.14	0.07	0.23	0.25	0.25	0.23
Patent applications to the EPO by priority year;						
Number	2.13	n)a	104.6	90.25	56 757	54 648
Per million inhabitants	3.48	n)a	9.51	8.38	112.03	106.84
European Union trademark (EUTM) applications.						
Number	14	6	710	755	80 182	75 884
Per million inhabitants	22.95	14.84	64.52	71.01	158.72	175.85

Data source: EUROSTAT
Updated 30.3.2020

In hindsight, the severity of the financial crisis in 2009 was under-appreciated. The means available to the Region to reverse its long-term structural weaknesses were constrained by the horizontal development policies designed at the national level and by the severe fiscal limitations of the period between 2014 and 2018, and were mostly ineffective. The long-term recession led to a decline of population by 1.8% since 2013, which is less that the national average of -2.53% but affected the age group 15-64 years old.

Although total employment has increased by 25,700 (+13.7%) since 2013, high tech sectors and knowledge intensive services have lost jobs. Figure 1 depicts the evolution of structural business statistics in the region between 2014 and 2017 by 2nd level NACE v2 codes using a relevant OECD taxonomy (Galindo-Rueda & Verger, 2016) to indicate the R&D intensity of each of them.

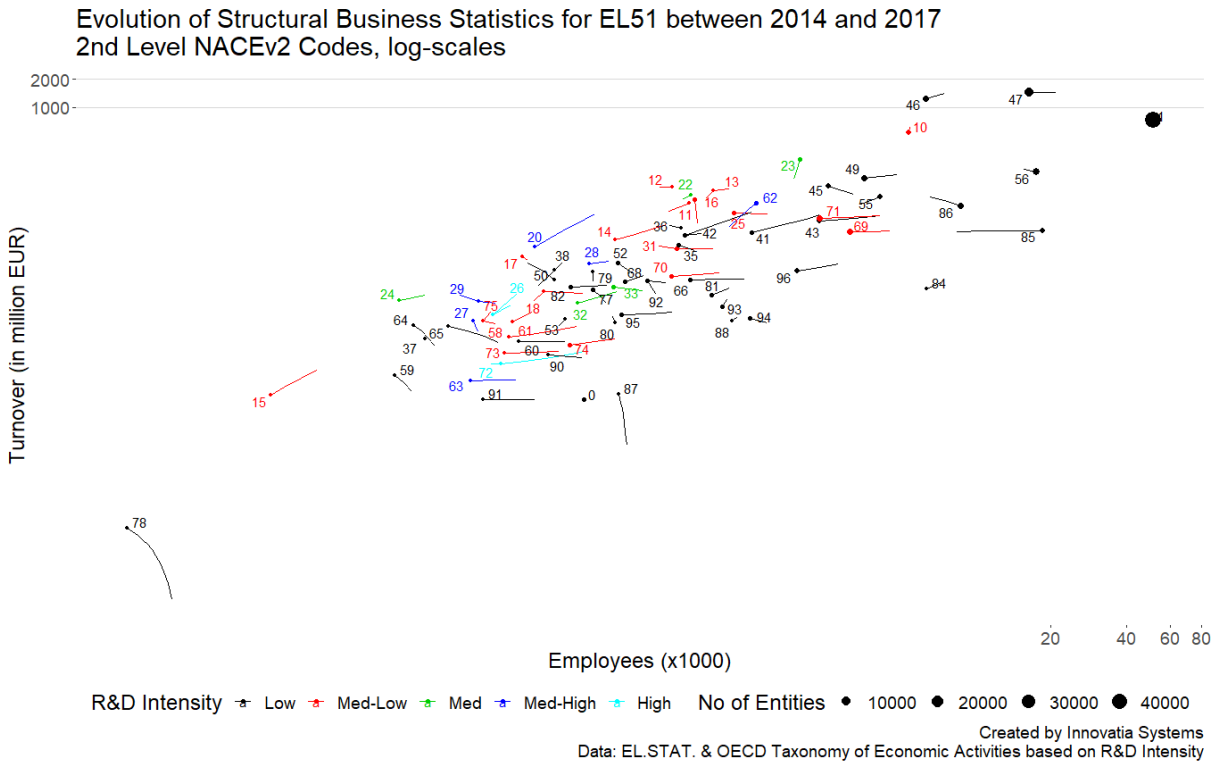

Figure 1 Region of Eastern Macedonia-Thrace: Evolution of structural business statistics between 2014 and 2017 (log scales). Source: EL.STAT.

Considering the regional performance in R&D, we notice in Table 2 a considerable decline in the R&D personnel since 2013, both in the number of researchers and the full-time equivalents. This is mainly driven by a decline of the number and the FTEs of researchers in higher education that is partially offset by increases in the business and government sectors. Although the gross regional expenditure on R&D (GERD) has increased in REMTH by 14% since 2013, the region did not follow either the national trend (+39%) in the same period and as Figure 2 and Figure 3 show, not much has changed in its relative position both in Greece and EU28.

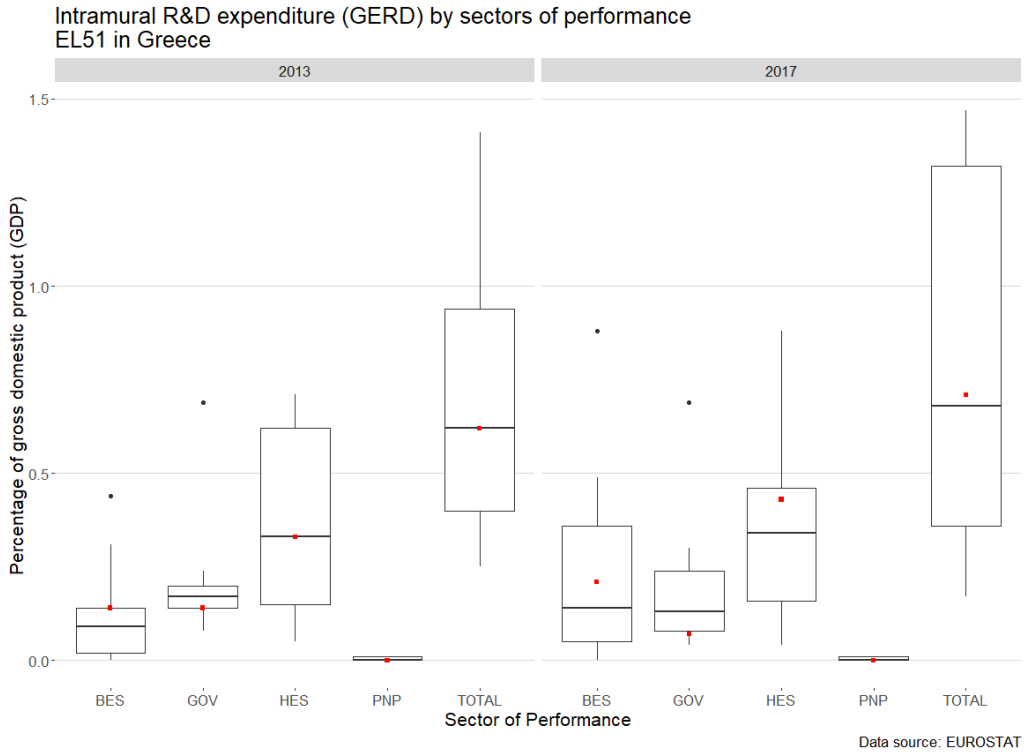

Figure 2 Evolution of GERD by sector of performance. REMTH (in red) benchmarked to all Greek regions in 2013 and 2017.

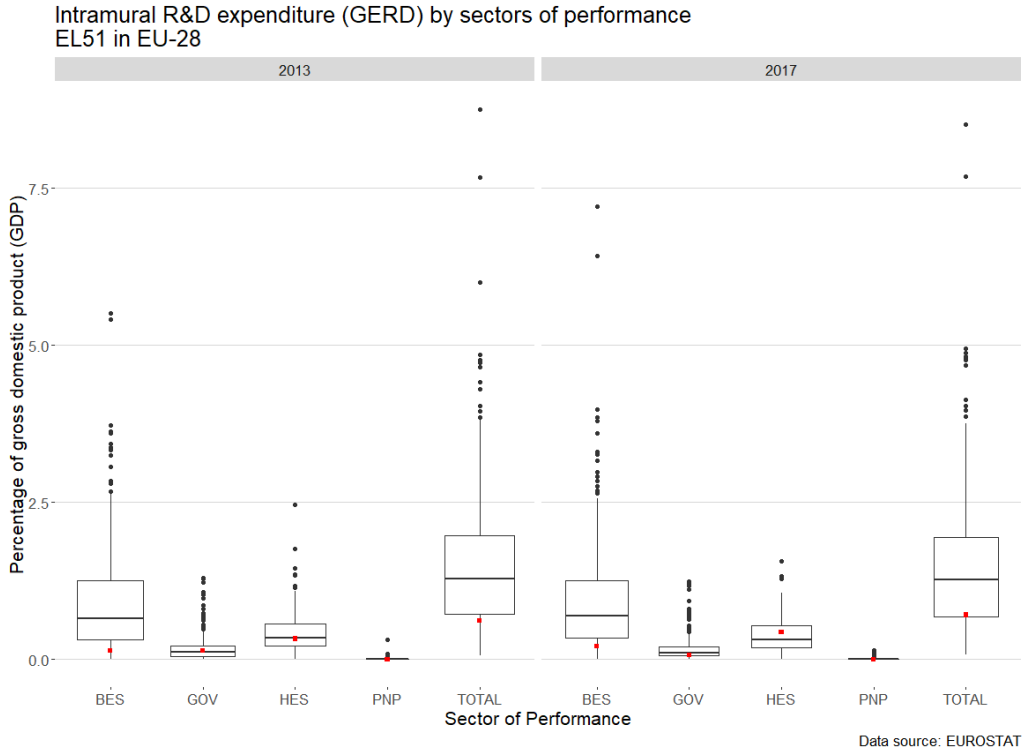

Figure 3 Evolution of GERD by sector of performance. REMTH (in red) benchmarked to all EU28 regions in 2013 and 2017.

Table 3 presents REMTH's relative position in Greece and EU28 according to the EU regional competitiveness index 2019 (Annoni & Dijkstra, 2019). Eastern Macedonia and Thrace is ranked 12th among the 13 Greek Regions and 265th among the 268 EU28 regions. Although the region's performance relative to EU28 has slightly improved since the 2016 version of the RCI (see Figure 4), its ranking has been consistently in the lowest positions among EU28 regions since the first EU Regional Competitiveness Index in 2010.

Table 3 EU Regional Competitiveness Index 2019: REMTh benchmarked to Greece and EU28

Indicator	GR ranking (in 13)	EU ranking (in 268)
Overall		
PCI 2019	12	265
GDP per head (PPS)	13	249
Stage of development (1-5)	n)a	n)a
Basic dimension	13	256
Institutions	13	260
Macroeconomic stability	n)a	n)a
Infrastructure	11	256
Health	12	199
Basic education	n)a	n)a
Efficiency Dimension		
Higher education and lifelong learning	10	220
	11	231
Labour market efficiency	7	252
Market size	8	252
Innovation dimension	8	254
Technological readiness	4	250
Business sophistication	10	197
Innovation	8	252

REMTH's group of peer regions identified by the RCI2019 report (Annoni & Dijkstra, 2019) includes Sud-Muntenia (RO31); Lubelskie (PL81); Dél-Alföld (HU33); Ipeiros (EL54); Podkarpackie (PL82); Észak-Magyarország (HU31); Warmińsko-mazurskie (PL63); Świętokrzyskie (PL72); Sud-Est (RO22); Dél-Dunántúl (HU23); Dytiki Ellada (EL63); Podlaskie (PL84); Észak-Alföld (HU32); Voreio Aigaio (EL41) and Sud-Vest Oltenia (RO41).

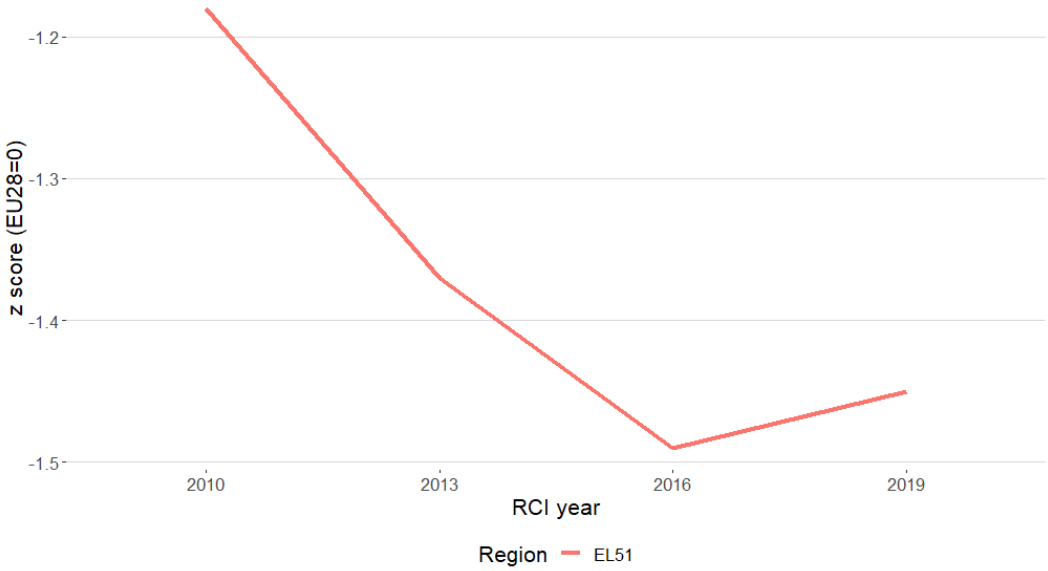

Figure 4 Evolution of RCI scores for REMTH (2010-2019)

4 The structure of higher education in Greece

4.1 The regulatory framework for Higher Education

The Greek Higher Education system is heavily centralized, governed by a set of laws and secondary regulations[1] which scope and gradual updates are discussed below. A new law was introduced in 2011 (Law 4009) to modernize the HE framework that was last amended in 1982, introduce quality assurance and improve the autonomy of HEIs. Despite the wide majority of more than 250 of 300 votes in parliament, Law 4009 was de facto ahead of its time and subsequent legislation pruned its most innovative features.

Law 4485/2017[2] is the latest legal document providing for the organization and operation of Higher Education in Greece. Art.4 of this law describes the mission of Higher Education Institutions, and explicitly mentions, among others, contributing to lifelong learning, responding to the development needs of the country, diffusing scientific knowledge, valorising research results, innovating.

HEIs are governed (Art 12-15) by a Senate, the Rectoral Council, the Rector and the Vice-Rectors. The Senate proposes the organizational structure of the HEI's academic, administrative and support units, which is approved by the Ministries of Education, Interior and Finance and is published in the Official Government Gazette (art 7). The Rectoral Council proposes the HEI's Internal Regulations which are approved by the Senate and are also published in the Official Government Gazette (art 8).

Decisions for hiring or promoting faculty members are taken at the Department level and the subsequent processes are run at the School level. The criteria for hiring and promoting faculty members are set by Art 14 of Law 1268/1982. The criteria to be explicitly taken into account are a doctoral degree in a relevant scientific discipline, the number of years of self-contained teaching in undergraduate or graduate courses, the number of scientific publications and citations, the number of doctoral dissertations supervised, and time served in directing research organizations. Minimum requirements are set for each level of faculty status. Any other documented attribute of academic, research, innovation or community engagement performance is considered per case. All hiring and promotion decisions must be approved by the Ministry of Education. The salaries of faculty members are regulated by Law 3205/2003 as amended, being the same for all HEIs in Greece. They are part of the institutional funding to the HEIs, being part of the Ministry of Education's budget for higher education.

Law 4653/2020[3] has introduced the Hellenic Authority for Higher Education (HAHE) with a mandate to contribute in the development and implementation of the national strategy for higher education and the distribution of block funding to HEIs and to evaluate and validate the quality of higher education by considering and applying the relevant standards and guidelines issued by the European Association for Quality Assurance in Higher Education. Art. 10 of Law 4653 defines the evaluation criteria and makes explicit mention to the digital skills and the relevance of education and skills to the needs of the labour market. However, research and community/industry engagement are not explicitly included so far in the evaluation criteria. Art. 16 of the same law introduces, for the first time in the context of Higher Education in Greece, performance-based criteria in the distribution of the Ministry of Education's institutional funding budget for HEIs. Specifically, 20 % of the institutional funding to HEIs will be distributed according to HEI-defined quality and performance indicators that consider research excellence and internationalization.

Art 49 of Law 4485/2017 establishes the so called Academic Councils of Higher Education and Research (ACHER) in every administrative Region with a mandate to: (a) develop strategy proposals for the development of HEIs and Public Research Centres at regional level, with the aim to promote higher education and research by considering the regional development strategy, the relevant recommendations or studies of the Regional Research and Innovation Council; (b) to promote cooperation and interactions between HEIs; and PROs with the social, cultural and economic actors of the Region; (c) recommend to regional HEIs/PROs appropriate

[1] See https://www.e-nomothesia.gr/kat-ekpaideuse/tritobathmia-ekpaideuse/?page=1
[2] Official Government Gazette, vol. A, n. 114, 4.8.2017
[3] Official Government Gazette, vol. A, n. 12, 24.1.2020

means and resources for their development and funding for researchers and graduates; and (d) to assist the State's oversight role by submitting to the Minister of Education a report on the degree of implementation of the strategic plan and the budget of the regional HEIs/PROs. Until today, no ACEHR has been set up in any Greek region.

Finally, during 2018-2019, a considerable consolidation in the structure of higher education took place in Greece by merging the technological branch of higher education, formerly known as Technological Educational Institutions (TEIs), with Universities, or by upgrading them to University status. According to Law 4610/2019[4], the TEIs of Central Macedonia, Thessaloniki and Eastern Macedonia and Thrace were abolished as individual and autonomous HEIs and were merged with the International Hellenic University (IHT) whose headquarters are in Thessaloniki. IHT's footprint in Eastern Macedonia-Thrace includes a campus in Kavala (Depts of Accounting and Finance, Management Science and Technology, Physics, Chemistry, Informatics and Geology), one in Drama (Depts of Forestry and Agricultural Biotechnology) and another one in Didymoticho (Dept of Nursing).

Institutional funding to HEIs is administered by the HE budget of the Ministry of Education, which is consistently declining since 2008, in line with the effects of the continuing recession on the public finances. This type of funding covers payroll and other operating expenses. There are many pathways to project funding, which is essential for supporting R&D, providing ancillary services such as technology transfer offices, careers offices and lifelong learning programmes, building or upgrading infrastructure and purchasing scientific equipment. Most of project funding comes from the national or the regional OPs, thus being ESIF-funded. Other sources of project funding include the National Public Investment Programme and the Hellenic Foundation for Research and Innovation, a new instrument funded by a European Investment Bank loan of €250mil, aiming to address brain-drain by creating new jobs for researchers.

According to the latest official statistics[5], the total number of students in higher education at the end of academic year 2017-2018 was 766,875. Of these, 659,535 were enrolled for undergraduate degrees, 78,118 for graduate degrees and 29,211 for doctoral degrees. The numbers for the HEI student population in Eastern Macedonia and Thrace were 35,939 (or 5.4% of the total undergraduate student population of Greece), 3,597 (4.6%) and 1,772 (6.1%), respectively. Attica (EL30) and Central Macedonia (EL52) collectively host 54% of the undergraduate student population and most importantly, 64 % of the PhD student population of Greece.

Table 4 quantifies the annual output of the Greek HE system in terms of graduates. The STEM degrees (fields 05, 06 and 07) are 29 % of all ISCED-6 degrees and 33 % of the doctoral degrees.

Table 4 Greece: Higher Education graduates at the end of academic year 2017-18.

Scientific Field	*Undergraduate Degrees (ISCED 6)*	*Graduate Degrees (ISCED 7)*	*Doctoral Degrees (ISCED 8)*
01 Education	3 896	1 598	84
02 Arts and Humanities	6 370	1 356	150
03 Social Sciences, Journalism and Communication	6 200	3 472	111
04 Business Administration, Management and Law	9 037	6 249	80
05 Natural Sciences, Mathematics and Statistics	3 590	2 591	206
06 Information and Communication Systems	1 375	753	46
07 Engineering	9 024	2 017	273
08 Agriculture, Forestry, Fisheries and Veterinary	1 468	364	47
09 Health and social welfare	5 233	2 072	531
10 Services	1 811	278	30

Data Source: EL.STAT. Updated 30.3.2020

[4] Official Government Gazette, vol. A, no. 70, 7.5.2019
[5] See https://www.statistics.gr/el/statistics/-/publication/SED33/-

Figure 5 presents the territorial dimension of higher education and research in REMTh by linking all the university departments and research centres that are currently operational to a campus. The rationale for having six campuses spread across the Region is based on, political, decisions that were made fifty years ago. The list of the university departments operating in the region suggests that, in terms of scientific disciplines, the region is endowed with a comprehensive higher education system.

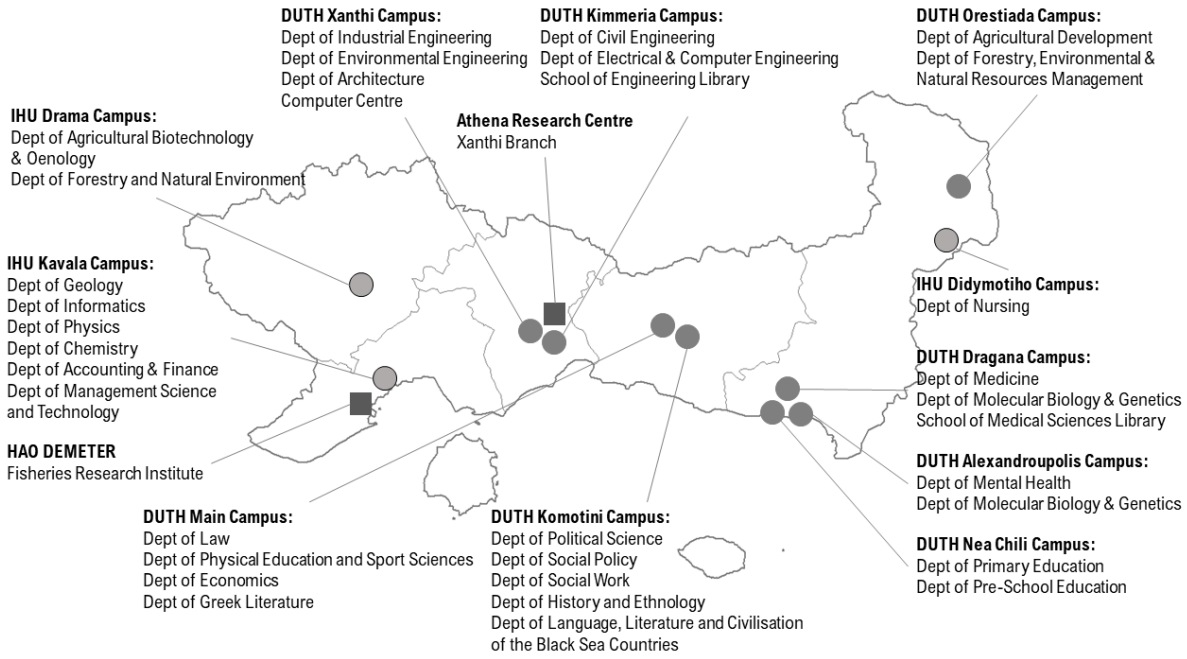

Figure 5 The territorial dimension of higher education and research in Eastern Macedonia-Thrace.

5 The role of Higher Education in S3

5.1 The National and the Regional Smart Specialisation Strategies

While preparing for the programming period 2014-2020, Greece chose to adapt a hybrid model for smart specialization strategies that comprises a national and 13 regional S3s. This model matched the architecture of the ESIF-funded Operational Programmes (OPs) for 2014-2020 that was developed by the General Secretariat for Public Investments of the Ministry of Development which coordinates the Managing Authorities of all ESIF-funded OPs. The GS for Public Investment follows a well-defined and time-tested process for developing the OP formal documents that includes written inputs, consultations and broad workshops.

The process of drafting the S3 documents started in 2013, in parallel with the same process for the OP documents. The General Secretariat for Research and Technology (GSRT) was assigned the task of producing the national S3 while the regional authorities, in very close cooperation with the respective Managing Authorities did the same for the Regional S3s. Very soon, the additional requirements imposed by S3, especially in governance, monitoring and in reducing overlaps in policy instruments at the national and at the regional levels became very clear. The JRC RIO reports of this period (Tsipouri & Athanassopoulou, 2015; Tsipouri, Athanassopoulou, & Gampfer, 2016; Amanatidou, Damvakeraki, & Karvounaraki, 2017) present in detail the elaboration of the Greek S3 documents.

The national S3 was approved by the Greek Parliament in August 2015[6]. Eastern Macedonia and Thrace's S3 was approved by the Regional Assembly a year earlier, on 14 July 2014.

5.1.1 Governance

At the time when the Greek national and regional S3s were being drafted, there was a legal void regarding the institutionalization of the governance structure proposed by the relevant guidelines of the European Commission (European Commission, 2012). This has caused several concerns and delays in the finalization of the S3 documents, especially the regional ones, where the 2nd chapter on governance was the last one to be finalised. The first attempt to address this issue at the national level was Law 4310 in 2014.

According to the provisions of Law 4310/2014 as amended later by Laws 4386/2016, 4635/2019 and 4674/2020, GSRT is responsible for drafting the 7-year National Strategy for Research, Technological Development and Innovation (NSRTDI or ΕΣΕΤΑΚ in Greek) and for coordinating its implementation and monitoring.

In developing the NSRTDI, GSRT is to be supported by the National Council for Research, Technology and Innovation (NCRTI, or ΕΣΕΤΕΚ in Greek), an 11-member committee introduced by L. 4635 in 2020, and several Sectoral Scientific Councils (SSCs, or ΤΕΚ in Greek), also introduced by the same law. Inter-ministerial co-ordination is achieved through a RTDI Coordination Committee that comprises Scientific Liaison Officers appointed by each ministry.

At the regional level, Law 4310 provided for the establishment of the so-called Regional Research and Innovation Councils (RRICs or ΠΣΕΚ in Greek) with a 4-year term. They were meant to support the development and implementation of the NSRTDI. Support is to be provided through expert recommendations, field studies, monitoring and benchmarking of the regional innovation systems and through stimulating the development of public-private partnerships and shaping the conditions and prospects for successful participation of regional organizations in national and European research projects. It is unclear in the legal text who initiates the drafting of such recommendations, who receives them, and who follows them up. Law 4635/2019 provides that two serving members of a RRIC are representing the 13 RRICs to the NCRTI, and this is the single instance of national-regional collaboration in the context of S3 explicitly mentioned in the legal texts.

[6] Official Government Gazette, vol. B, no 1862, 27.8.2015.

Following the provisions of Law 4386/2016, the RRIC in Eastern Macedonia and Thrace was established on 21 March 2017 following a decision by the Governor that was published in the Official Government Gazette on 28 March 2017[7]. It replaced a provisional structure that had been set up with a much wider mandate, as dictated by the regional S3 in 2014.

Figure 6 provides the current governance structure of the S3 in Greece as specified by the applicable laws. The central roles of the Ministry of Development and Investments and the GSRT are indicated in bold.

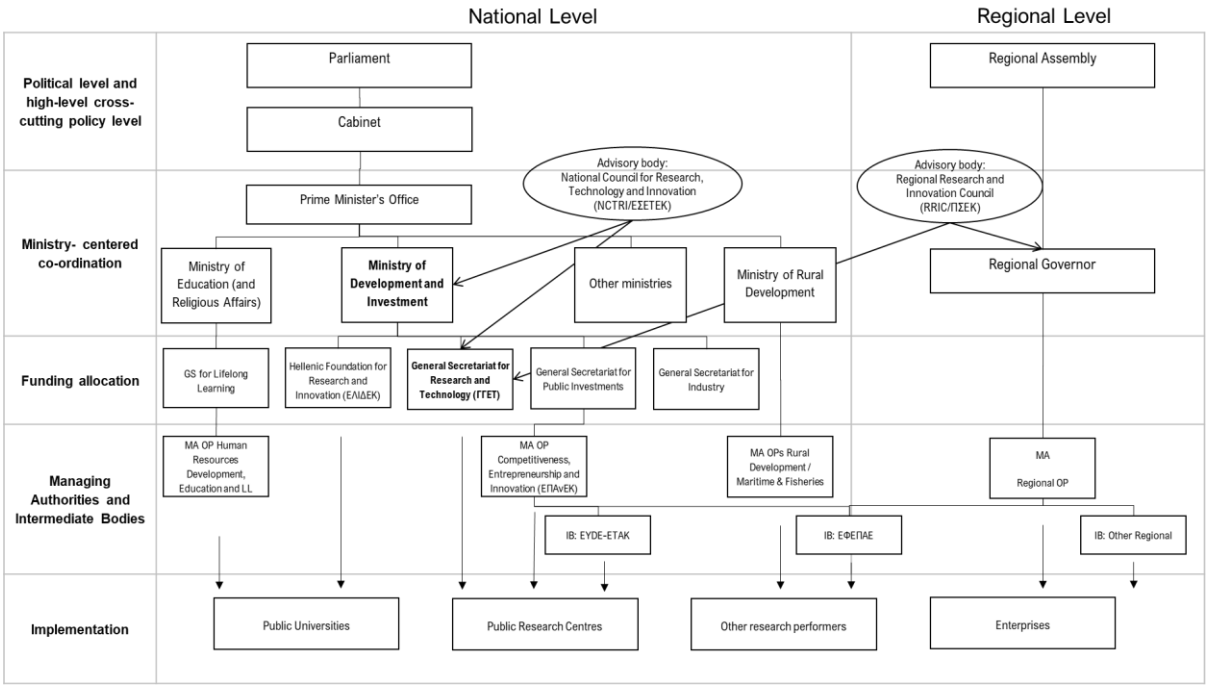

Figure 6 The Greek S3 Governance System as specified by the applicable laws.

Although is it rather clear from the discussion above that GSRT has assumed the role of the Management Team, as conceived in European Commission's Guide (European Commission, 2012, pp. 38--39), for the national S3, there are no such entities at the regional level. Given the void in the institutional framework, most regions have delegated this responsibility to entities created ad hoc, or, in the case of Crete which is considered as a Greek best case with respect to S3 governance, to an organisational unit within the Regional Administration having similar responsibilities. The JRC 2018 Survey on the S3 Status in Greece[8] indicates that the ad hoc schemes did not actually work and therefore 12 of the 13 Greek regions are considering setting up their 'S3 Technical Offices' by assessing four options of organizational embeddedness (Regional Administration, Managing Authority, Regional Development Fund, organisational separation) and three operating formats (inhouse, outsourced, hybrid). Preparing for the new programming period 2021-2027, Eastern Macedonia-Thrace plans to use the hybrid format using its Regional Development Fund as the hosting organisation.

The absence of such entities in most Greek regions affected, among others, S3 monitoring. Following a reminder by the General Secretariat for Public Investments in January 2019, only 7 out of 13 regions managed to submit their S3 monitoring reports by the end of November 2019: Eastern Macedonia-Thrace

[7] Members and affiliations: Prof Pantelis N. Botsaris (DUTH, Chair), Petros Soukoulias (SEEMS), Konstantinos Houvardas (REMTH), Christos Partsias (Reg Dev Fund), Dr Panagiota Galiatsatou (Technical Chamber of Greece), Prof George Gkaintatzis (DUTH), Prof Yannis Karafyllidis (DUTH), Prof Georgios Mallinis (DUTH), Prof Dimitrios Mpantekas (IHU), Prof Achilleas Christoforidis (IHU). Source: https://www.pamth.gov.gr/index.php/el/dioikisi/sylloqika-organa/perifereiako-symvoylio-kainotomias/synthesi

[8] Metaxas, M. (2019). Summary Report on RIS3 Implementation Status in Greece. JRC Lagging Regions Project Deliverable, 6 November.

was not among them. The same for the national S3, covering the period from 2014 to 2018 was finally published in GSRT's website[9] in March 2020.

5.1.2 Priorities

The prioritisation process used by the national S3 is described in section 4.2 of the main document (General Secretariat for Research and Technology, 2015, pp. 57-63). Eight main priority sectors were identified, namely:

1. Agri-food complex,
2. Culture, tourism and creative industries,
3. Health, pharmaceuticals and life sciences,
4. Energy production and services,
5. Transport services and logistics,
6. Environmental sciences,
7. Information and Communication Technologies, and
8. Materials and construction.

The national S3 intends to support these sectors with the aim of improving the viability, export potential, innovation and existing scientific specialisation of human resources in research and development. Following a round of the entrepreneurial discovery process organised by the GSRT, a list of sub-priorities and specific R&I activities per sector were identified and attached as Annex 2 to the strategy[10]. They have been used consistently ever since in all national calls related to thematic objectives 1 (the full list of annex 2) and 3 (only the eight priority sectors).

The prioritisation process of the regional S3 considered the results of a very thorough assessment of the regional economic and research context and the first findings of the national S3 that were available at that time. The first output of this process was the identification of a set of sectors of interest (Region of Eastern Macedonia and Thrace, 2015, pp. 72-73):

1. Agri-food
2. Non-metal minerals (i.e. marble)
3. Plastics and Rubber
4. Chemicals and Pharmaceuticals
5. Electric and Electronic Equipment
6. Tourism

Three regional priority sectors overlap with the national ones (Agro-food, pharmaceuticals, tourism), two more partially overlap (plastics/rubber with materials and electric/electronic equipment with ICT) and one (non-metal minerals) is unique to the region. However, REMTH's S3 is more specific on the support to be provided to the regional sectors of interest. In a nutshell, the regional S3 comprises three pillars of priorities:

1. Horizontal priorities

[9] See http://www.gsrt.gr/central.aspx?sId=120I466I1396I646I496396&olID=824&neID=824&neTa=20237&ncID=0&neHC=0&tbid=0&lrID=2&oldUIID=aI824I0I120I466I1396I0I2&actionID=load

[10] http://www.gsrt.gr/Financing/Files/ProPeFiles19/%CE%A0%CE%91%CE%A1%CE%91%CE%A1%CE%A4%CE%97%CE%9C%CE%91%202.pdf

a. Upgrading the institutional capacity of the regional innovation system,

b. Upskilling and retaining human capital

c. Targeted supply of knowledge and promotion of the absorptive capacity of the enterprise sector

d. Improvement of the density of inter-regional and intra-regional networks

2. Transformation of the agro-food complex

    a. Modernisation of the agri-food complex by means of technology-driven innovation

    b. Promotion of the diffusion, the adaptation and the adoption of process, organisational and marketing innovations in the agri-food complex

3. Provision of opportunities for growth for the emerging and promising sectors of the regional economy

    a. Stimulate the development of technology-driven product or process innovations (plastics, pharmaceuticals, chemicals, electric and electronic equipment)

    b. Attract investments in new manufacturing plants (plastics, pharmaceuticals, chemicals, electric and electronic equipment)

    c. Support the enrichment of the product mix in tourism by means of organisational and marketing innovation

    d. Support access to new markets for the non-metal minerals sector by means of marketing innovations

    e. Attract or/and stimulate investments in services that support strong or emerging sectors of the regional economy

The results of the prioritisation process described above were used as the basis for the entrepreneurial discovery process that followed. The region benefited from extensive support from the European Commission JRC in designing and running the EDP and finalising the S3 (Boden et al., 2016). The JRC partnered with the region to support in the establishment of a sustainable and effective entrepreneurial discovery process, engaging stakeholders in the identification and refinement of priorities areas to feed the policy process (Marinelli et al., 2016). A series of "Entrepreneurial Discovery Process Focus Groups" were organised, each focused in one of the region's S3 priorities, with the aim of identifying innovative project ideas through the interaction between business, public and research sectors. In addition, Project Development Labs (PDLs) followed the EDP focus groups and on-line stakeholder consultation, with the aim of further refining ideas from the EDP focus groups and taking them closer towards implementation, identifying funding opportunities and action plans for policy. As a result of this work, 1) the capacity of stakeholders to develop ideas and identify funding sources improved, 2) the coordination of the regional and national level plans improved, and 3) a governance working group was set up to define a S3 governance system

5.1.3 Policy Mix and Funding

Regarding funding, the regional S3 made an informed assumption of the total budget that could be leveraged from all available sources. By considering co-financing rates, the budget of the regional S3 could reach more than €2billion of public expenditure and private co-financing, broken down as follows:

- Regional OP: €129mil
- OP Competitiveness, entrepreneurship and innovation: €852mil
- OP Human Resources Development, Education and Lifelong Learning: €22mil.

- OP Rural Development & OP Maritime and Fisheries: €1029mil
- OP Reform of the Public Sector: €5mil
- Horizon2020: €20mil

From the above, it is clear that the regional S3 by design is heavily dependent on the national OPs and therefore, the policy instruments used applied mostly at the national level.

5.2 The role of HEIs in the Regional S3

Since 2013, the regional HEIs and PROs, namely Democritus University of Thrace, the Technological Educational Institute of Kavala, the Xanthi Branch of Athena Research Centre and the Fisheries Research Institute of HAO Demeter, have been participating in all parts of the lifecycle of the regional S3 being represented by their senior management and, depending on the situation, by senior staff or faculty members. The minutes of a series of meetings in late 2013 and in 2014 indicate that HEI/PRO senior management were involved in finalising the vision statement, in setting priorities and in finalising the Action Plan. The provisional S3 Steering Committee that was established following the approval of the regional S3 by the Regional Assembly in 2015 included the Rectors/Vice-Rectors of both Democritus University and TEI Kavala and the Director of Research of Athena Research Centre/Xanthi Branch. As already mentioned in section 5.1.1, the Regional Research and Innovation Council (RRIC) established under Law 4386 in 2017 is chaired by the former Vice-Rector of Research of DUTH, having as members two senior faculty members of DUTH and IHU (formerly TEI Kavala). Therefore, the regional HEIs have an active role in the governance settings of Eastern Macedonia-Thrace's S3. However, as indicated by the findings of the field interviews, the effectiveness of the current governance setting is rather limited for reasons unrelated to HEI participation.

Eastern Macedonia and Thrace was one of the few Greek regions that performed a full mapping of its knowledge sector in preparing for their RIS3 by performing a bibliometric analysis of the scientific publications produced by the regional HEIs/PROs in conjunction with their cashflows from competitive research grants and consultancy services. All this evidence was used to inform priority selection and later, to elaborate the RIS3 Action Plan on the basis of a sound SWOT analysis.

Table 5, compiled using publicly available beneficiaries' data[11], presents the status of ESIF implementation in Greece in terms of approved projects on 28 January 2020. EARDF is not included. Out of a total budget of €8.9billion of public expenditure for approved projects, the share of Eastern Macedonia and Thrace is approximately 14% or €1.3billion. The regional OP (45%), OP Competitiveness, entrepreneurship and innovation (25.4%) and OP Human Resources Development, Education and Lifelong Learning (14.3%) are the top 3 contributors in decreasing order, with an aggregate contribution of 84.7% of the budgeted public expenditure.

The two regional HEIs, i.e. Democritus University of Thrace and International Hellenic University (formerly TEI Eastern Macedonia and Thrace), are explicitly mentioned as beneficiaries for projects having an aggregate public expenditure budget of €151million, with their share in these projects being €90.8million. Of these projects, some have an interregional dimension, i.e. being national-wide, or, some others mostly with IHU are being implemented out of the region. The two HEI's share of the projects implemented in Eastern Macedonia and Thrace have a public expenditure budget of €70.8million (~€54.4million for DUTH and ~€16.4million for IHU). The regional OP is the main source of funding for these projects, contributing 93.3% of the public expenditure.

Moreover, the regional HEIs are indirect beneficiaries in several other projects administered by entities at the national level and partially implemented in the Region. These are discussed in detail in the sections that follow.

[11] See https://www.espa.gr/el/Pages/ProgramsList.aspx, last updated on 28.1.2020.

Finally, according to data provided by the Managing Authority of the OP Rural Development[12], another €489.3million of public expenditure from EARDF have been decided for implementation in Eastern Macedonia-Thrace.

The mandate of this report explicitly restricts the analysis to the ESIF investments devoted to the regional HEIs and PROs under Thematic Objectives 1 and 10. We start our analysis by considering the distribution of the planned public expenditure[13] among the Greek OPs for TO1 (Figure 7) and TO10 (Figure 8)[14].

Table 5 ESIF funding, in Euros, to regional higher education institutions as of 28 Jan 2020.

	Public Expenditure for category	*Total Public Expenditure*
All projects of National OPs + Cross-Border OPs + ROP REMTH	n)a	9 279 126 195
of which, implemented in EL51	1 297 045 406	8 912 941 452
01- Competitiveness, entrepreneurship and innovation	330 004 791	4 473 665 733
03- Human Resources Development, Education and Lifelong Learning	185 318 604	2 072 038 035
04-Public Sector Reform	58 913 456	458 722 525
05-Regional OP Eastern Macedonia and Thrace	583 326 233	584 971 359
19-Maritime and Fisheries	12 116 229	40 437 747
20-Technical Assistance	42 643 529	1 149 294 864
22-Interreg V-A Greece-Bulgaria	82 552 018	127 944 605
26-Balkan-Mediterranean	2 170 546	5 866 584
All projects with the Regional HEIs as direct beneficiaries	**90 781 008**	**151 024 371**
of which, implemented in EL51	**70 751 946**	**82 559 579**
All projects with **DUTH** as beneficiary	58 178 023	81 791 926
of which, implemented in EL51	54 386 849	60 508 687
05- Regional OP Eastern Macedonia and Thrace	41 026 664	41 026 664
01- Competitiveness, entrepreneurship and innovation	7 140 206	9 563 613
03- Human Resources Development, Education and Lifelong Learning	4 217 940	5 002 024
26-Balkan-Mediterranean	1 157 917	3 841 324
22-Interreg V-A Greece-Bulgaria	844 122	1 075 062
All projects with **IHU/TEI REMTH** as beneficiary	32 602 985	69 232 445
of which, implemented in EL51	16 365 097	22 050 892
05- Regional OP Eastern Macedonia and Thrace	9 716 679	9 716 679
03- Human Resources Development, Education and Lifelong Learning	2 008 276	7 055 974
01- Competitiveness, entrepreneurship and innovation	4 181 652	4 819 749
19-Maritime and Fisheries	458 490	458 490

From the data above it is clear that the national OPs are the main sources of funding for both research, technological development and innovation (TO1) and educational & vocational training (TO10). This also explains their expected contribution to the regional S3 in REMTh as presented in section 5.1.3 above. Another qualitative element regarding the planned public expenditure for TO10 is that the regional OPs get their funding from ERDF (thus, mainly for infrastructure) while the national OPs are funded from ESF and thus, support people.

[12] See http://data.agrotikianaptixi.gr/regional.html
[13] Public expenditure is the sum of the ESIF contribution and the national co-financing.
[14] Data source: https://cohesiondata.ec.europa.eu/2014-2020/ESIF-2014-2020-FINANCES-PLANNED-DETAILS/e4v6-qrrq/data

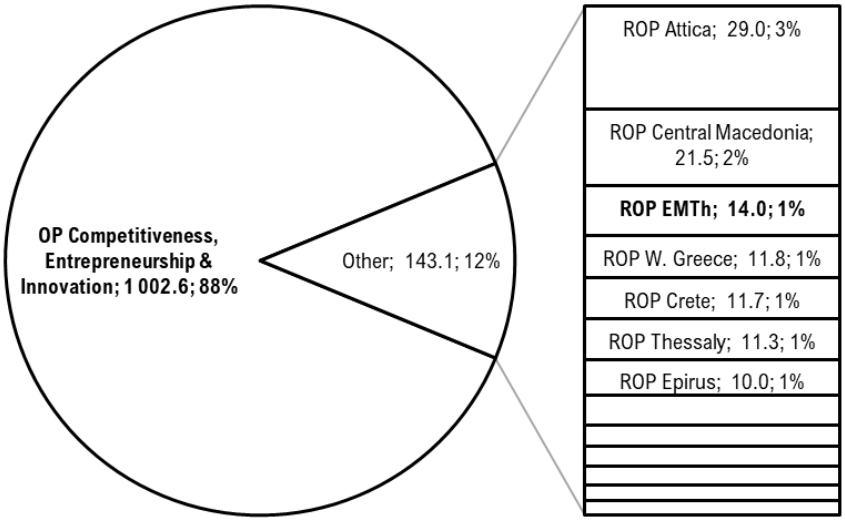

Figure 7 ERDF Thematic Objective 1: Distribution of planned public expenditure among Greek Operational Programmes (values in million Euros).

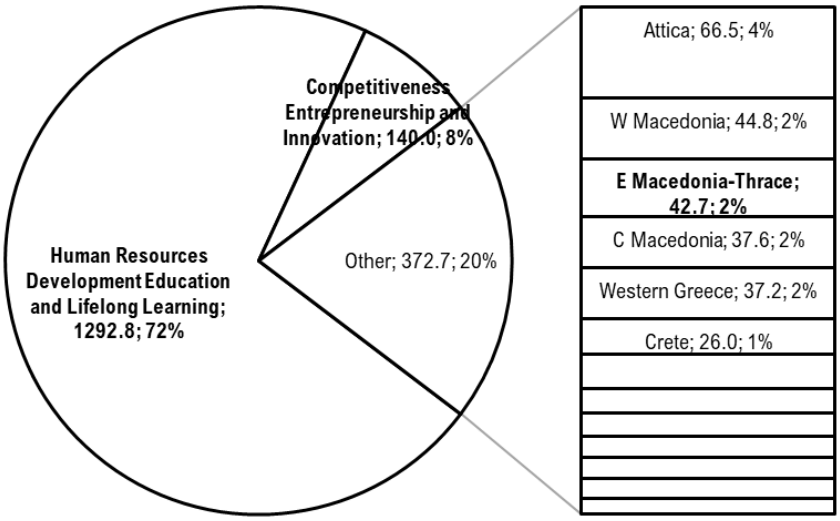

Figure 8 ERDF & ESF: Thematic Objective 10: Distribution of planned public expenditure among Greek Operational Programmes (values in million Euros).

Regional OP

Regarding thematic objective 1, the regional Managing Authority has launched five calls[15], all being addressed to SMEs in the S3 priority sectors aiming to support their R&D&I efforts. The beneficiaries could subcontract part of the R&D activity to third-party research performers including HEIs and PROs. Seventeen projects have already been selected for implementation with a budget of €3.23mil of public expenditure.

The beneficiaries' outsourcing decisions can provide some insight regarding the degree of networking among regional enterprises and research organisations:

- In Call 36, which was addressed to stakeholders in the chemicals-plastics sector, one out of four projects used a regional technology provider (IHU, formerly TEI Eastern Macedonia-Thrace) while the other three outsourced their R&D to Universities in Ioannina, Athens and Patras.

[15] Call numbers 36/16.1.2017, 42/3.5.2018, 48/3.5.2018 66/28.3.2019 and 89/7.2.2020.

- In call 42 focusing on non-metal minerals, the two beneficiaries outsourced their research to a regional (IHU, formerly TEI Eastern Macedonia-Thrace) and an extra-regional research performer (TU Crete)
- In Call 48 focusing on Electronics, all four beneficiaries have chosen regional technology providers (Democritus University and IHU)
- In Call 66 focusing on Agrofood, 3 of the seven beneficiaries have chosen a regional technology provider, while the remaining have outsourced their R&D to University of Thessaloniki (2), University of Western Attica and University of the Aegean.

We shall revisit this issue upon discussing similar national calls launched by the OP Competitiveness, Entrepreneurship and Innovation.

Regarding thematic objective 10, the regional Managing Authority has launched three calls[16] for investment priority 10(a) related to upgrading HE infrastructure. All three were addressed to the two regional HEIs, i.e. Democritus University of Thrace and the (former) Technological Educational Institution of Eastern Macedonia and Thrace. Eight projects were selected (7 for DUTH and one for TEI EMTh), with an aggregate public expenditure budget of €81.23million. Two of these projects funded new buildings in Alexandroupolis and Komotini while the remaining six funded the purchase of software, hardware, scientific equipment and furniture.

Beyond these, under thematic objective 3, both regional HEIs have been awarded a total of €1.89million to set up two business incubators in their Xanthi and Kavala campuses.

OP Competitiveness, entrepreneurship, and innovation (EPAnEK)

According to monitoring data of the national S3 provided by GSRT, until the end of 2018 EPAnEK had launched the following TO1 calls:

1. Investment priority 1(a) (research infrastructures). Three calls with a total budget of €126.5million of public expenditure were launched, 58 projects were approved. HEIs/PROs in REMTH participate in 16 of the approved projects and their share of the budget is €2.97million. The Department of Molecular Biology and Genetics (DUTH) is the most active participant, being a partner in 6 of these projects.
    a. Call 39/29.7.2016 "Support to research and innovation infrastructures (1st call)" with a budget of €75.5million.
    b. Call 88/22.12.2017 "Support to research and innovation infrastructures (2nd call)" with a budget of €20million. This call was not addressed to research entities in REMTH.
    c. Call 31/29.7.2016 "Strategic development of research and technological organisations" with a budget of €31million. This call was addressed to Public Research Organisations.
2. Investment priority 1(b) (research and development, innovation):
    a. Call 1180/356/A2/10.3.2017 "Integrated Action for State Aid for Research, Technological Development & Innovation 'Research-Create-Innovate' (1st Call)" with an initial budget of €260million that was subsequently increased to €342.5million due to increased demand.
    b. Call 1596/340/B1/14.3.2019 "Integrated Action for State Aid for Research, Technological Development & Innovation 'Research-Create-Innovate' (2nd Call)" with of €200million.
    c. Call 3402/2769/A2/10.7.2017 "Special Research Action in Aquaculture, Industrial Materials and Open Innovation in Culture" with a budget of €24.25million that was increased to €29million due to strong demand. A total of 71 projects have been selected so far with 106

[16] Calls 13/11.5.2017, 40/25.10.2017 and 65/18.10.2018

participants but the regional distribution of project participants and budgets are not available[17].

d. Calls 6163/1864/A2/20.10.2016 "ERA-NETS-2018" and 2459/401/A2/2.5.2018 "ERA-NETS-2018" with a total budget of €7.1million. No participants from REMTH in these calls.

e. Four calls for bilateral and multilateral R&D collaboration between Greece and Germany (6.12.2016), Russia (9.12.2016), Israel (13.1.2017) and China (26.1.2018) with a total budget of €21million. By the end of 2018, the budget of approved projects was €11.39million with the share of REMTh being €1.033million (9%).

Given the prominence of the two calls of the "Integrated Action for State Aid for Research, Technological Development & Innovation" (or "Erevno-Dimiourgo-Kenotomo" in Greek, thus "EDK" in brief) in the Greek R&D&I landscape, we use the available data regarding participation and approved projects as a proxy to get some insight regarding various aspects of the regional S3 of Eastern Macedonia and Thrace:

- **Inter-regional and intra-regional networking**. As already discussed in Section 0, one of the major priorities of the regional S3 was to stimulate the participation of the regional stakeholders in wider research and innovation networks. The network analysis of EDK applicants (see Figure 9 for the network by participant type and Figure 10 for the network by locus of participant) indicates that this is already happening in the context of Greece. As suggested by Figure 10, there seems to be strong ties between REMTh (EL51) and Attica (EL30) and Central Macedonia (EL52), which are the top-tier Greek regions in terms of R&D performance. Moreover, the entities at the centre of these networks are enterprises. This suggests that inter-regional networking is mainly driven by the need of regional enterprises to innovate by sourcing knowledge from regional and extra-regional knowledge providers.

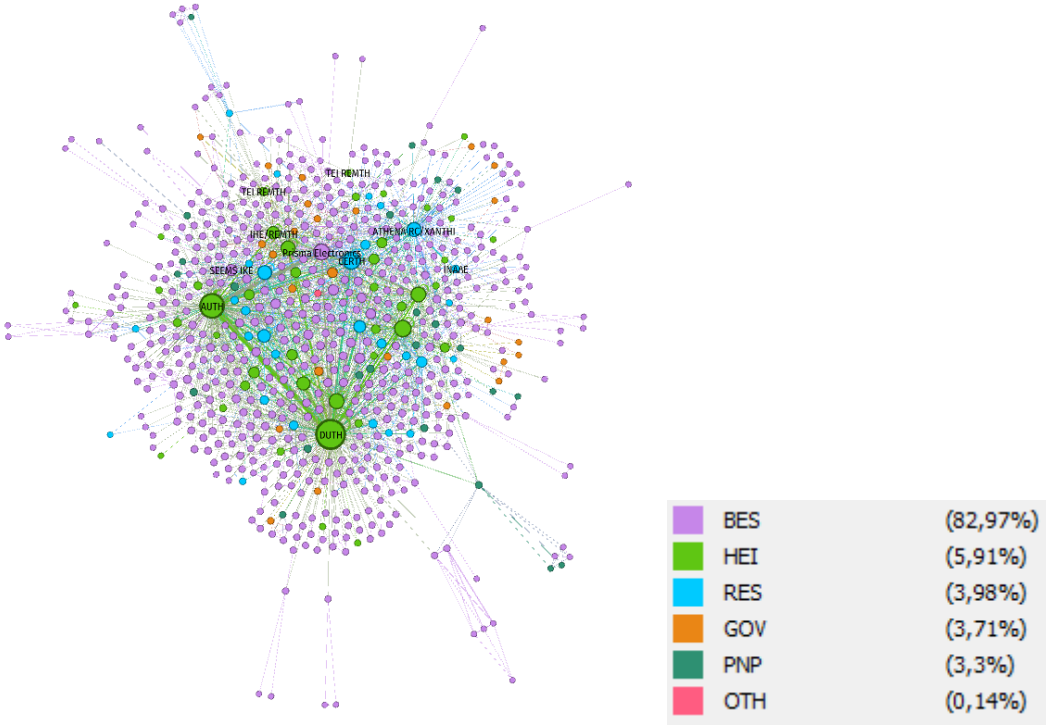

Figure 9 Collaboration map of all EDK applications by entities in REMTH, by type of organisation.

[17] See http://epan2.antagonistikotita.gr/uploads/20200316_4h_trop_apof_ent_ydat.pdf

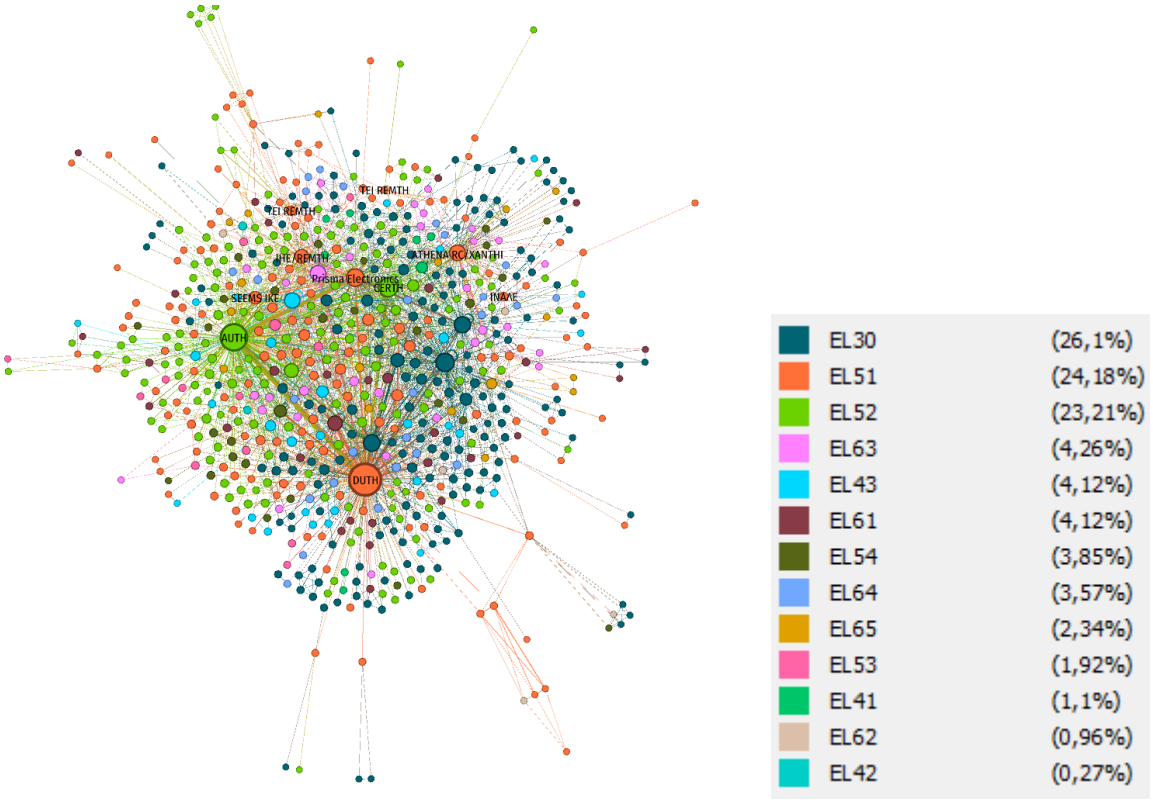

Figure 10 Collaboration map of all EDK applications by entities in REMTH, by NUTS2 region.

- **Apparent specialisation**. The calculation of the location quotients using the number of participants per priority area as the key variable indicates that REMTH was consistently over the national average, i.e. LQ>1, in terms of approved proposals in Agrofood and ICT. This suggests that ICT should be reconsidered in the next revision of the regional S3 and gain more focus.
- **Size of the R&D&I ecosystem in REMTh**. The number of EDK proposals (both calls) having at least one partner from REMTh was 2037. There were 729 unique participants in these, of which 175 operating in REMTh. In the latter, 157 were enterprises (Figure 11). Of the 2037 proposals with REMTh participation, 404 (19.8%) were approved for funding. There were 210 unique participants in these 404 projects, 64 of them operating in REMTh and 57 being enterprises (Figure 12). This might suggest that 64 REMTH R&I stakeholders have potential for national scale collaborations and 110 for regional scale collaborations, even though further information on the reasons behind the non-funded projects would be needed to extract clear conclusions. Moreover, most of the participants in the regional calls mentioned in Section 0 have also participated in EDK (and their proposals were approved). The distribution of earmarked public expenditure is approximately equal between enterprises and HEIs/PROs (Figure 13). The next revision of the regional S3 should consider appropriate policy instruments tailored to these populations and specific measures to stimulate R&D&I in the non-R&D&I-performing population of SMEs.

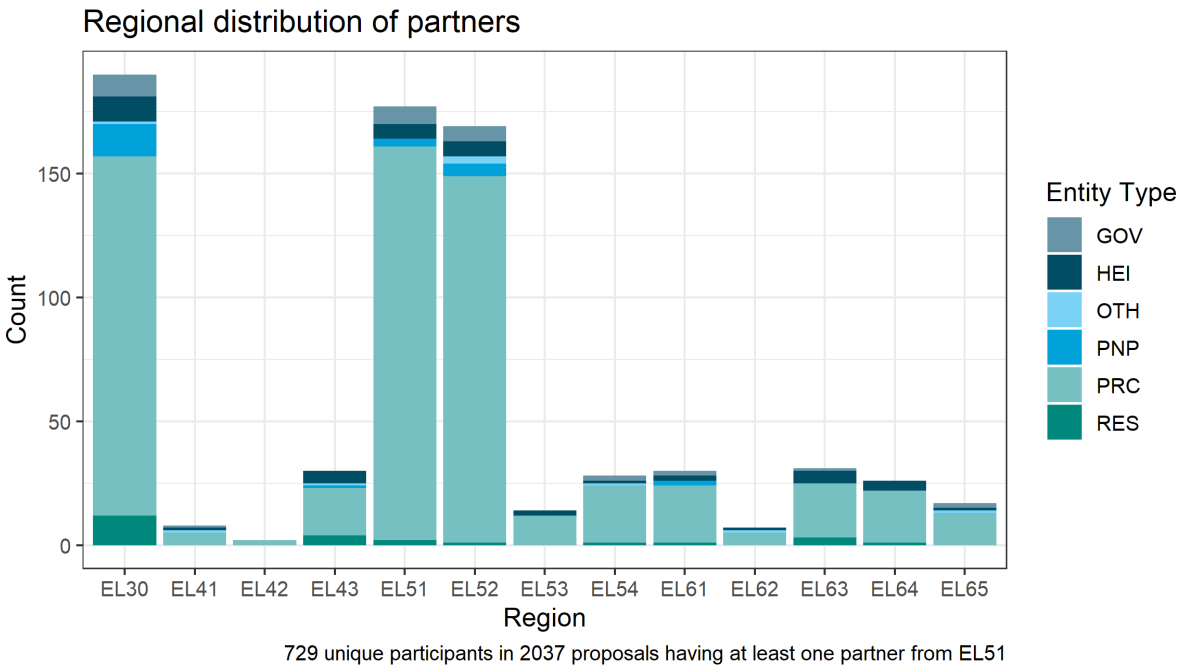

Figure 11 Summary of the unique participants in all EDK applications by entities in REMTH

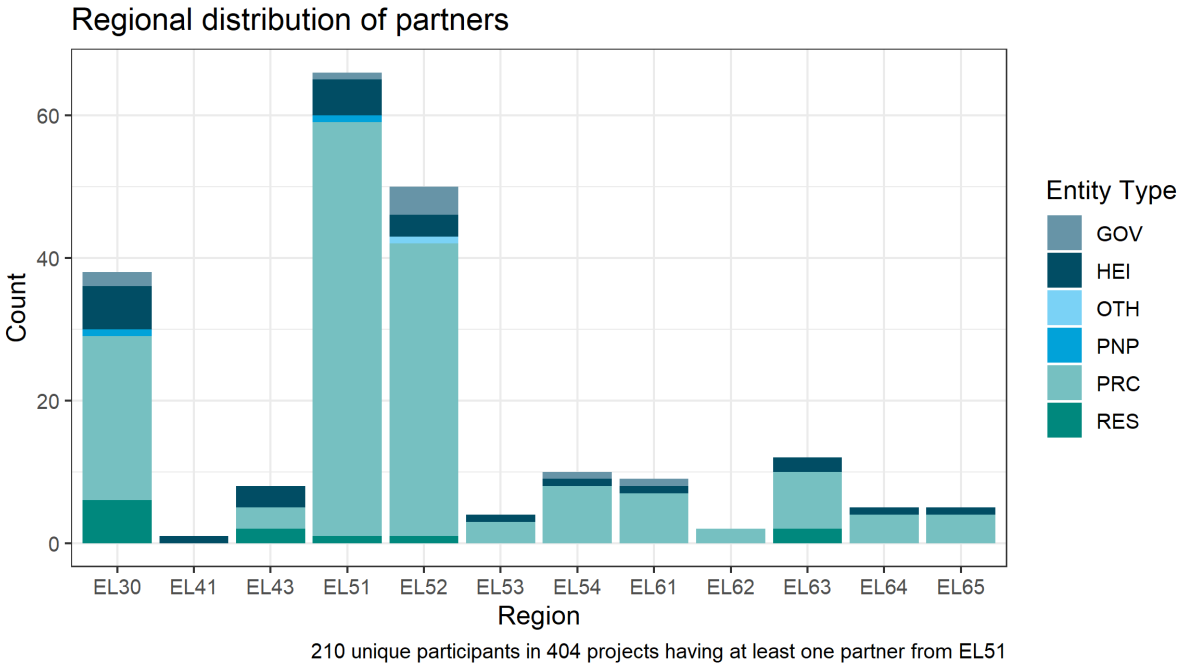

Figure 12 Summary of the unique participants in all EDK projects having a partner in REMTH.

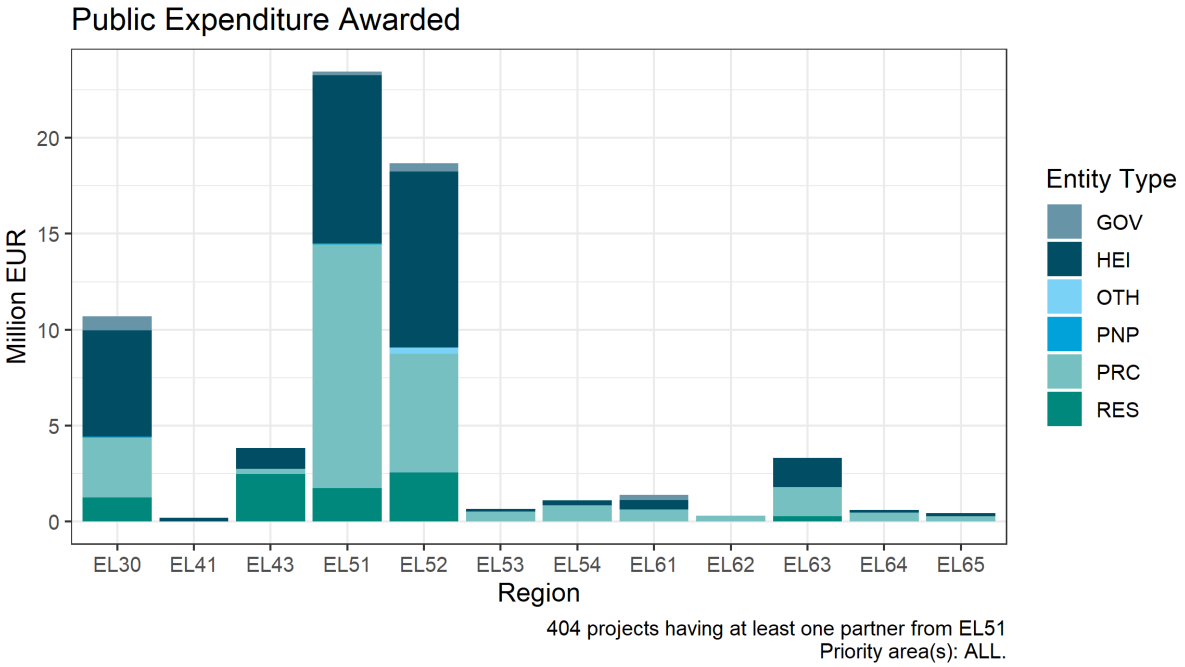

Figure 13 Public expenditure budgets in all EDK projects having a partner in REMTH.

- **Relative competitiveness of the R&D&I ecosystem in REMTh**. Table 6 presents the budgeted public expenditure for the stakeholders in REMTh participating in approved EDK projects (both calls). ICT, Agrofood and Tourism/Cultural Industries are the top 3 performers. It is noteworthy that half of the budget approved for the business enterprise sector is channelled to ICT and Agrofood. However, if we consider that the regional stakeholders have managed to leverage €23.5million of public expenditure out of the available €542million, which is 4.33%, significant doubts can be raised regarding the relative competitiveness of the regional innovation system in the context of Greece.

Table 6 EDK (both calls). Budgeted Public Expenditure (in EUR) of approved projects with REMTH participation by sector of performance.

Priority Area	*BES*	*HEI*	*RES*	***Total***
1 Materials-Construction	470 513	291 086		**761 599**
2 Tourism and Cultural Industries	961 754	1 217 362	1 275 751	**3 454 867**
3 Agrofood	3 040 191	1 847 378	190 164	**5 077 734**
4 Environment	1 681 563	1 072 197		**2 753 760**
5 Health and Pharmaceuticals	596 528	1 566 508	263 538	**2 426 574**
6 Transport and Logistics	1 313 823	207 500		**1 521 323**
7 Energy	1 048 547	213 000		**1 261 547**
8 ICT	3 584 572	2 364 050	256 000	**6 204 622**
Total	**12 697 490**	**8 779 082**	**1 985 454**	**23 462 025**

According to the beneficiaries' data mentioned earlier, there was only one call for TO10 with HEI participation in REMTH:

1. Investment priority 10 (vi).
    a. Call 3656/02.07.2018 "Internships for Higher Education Students", administered by concession to the MA of the OP Human Resources Development, Education and Lifelong Learning.

i. Democritus Univ was awarded a €3.13million project

ii. IHU (formerly TEI Eastern Macedonia and Thrace) was awarded a €2.7million project.

OP Human Resources Development, Education and Lifelong Learning

In the framework of OP HRDELL, the two regional HEIs were direct beneficiaries in projects related to supporting researchers as follows:

1. Investment priority 10 (ii): A total of 8 projects with DUTH/IHU as direct beneficiaries have been approved with a total budget of €3.87million under the following calls:
    a. Call 20/15.3.2016 "Providing Academic Experiences to Young Researchers having a PhD" that was subsequently modified, with a total budget of €6.89million.
    b. Call 45/17.5.2017 "Providing Academic Experiences to Young Researchers having a PhD 2017-2018" with a total budget of €8.3million.
    c. Call 82/21.5.2018 "Providing Academic Experiences to Young Researchers having a PhD 2018-2019" with a total budget of €19.96million.
    d. Call 96/18.3.2019 "Providing Academic Experiences to Young Researchers having a PhD 2019-2022" with a total budget of €19.96million.

    The above calls support PhD holders having been awarded their doctoral degrees within the last decade to gain teaching experience in higher education, thus improving their prospects for following an academic career.
2. Investment priority 10 (ii): A total of 10 projects with DUTH as the direct beneficiary have been approved with a total budget of €0.58million under the following calls:
    a. Call 34/5.12.2016 "Support to Researchers with emphasis on Young Researchers" with a total budget of €12.81million
    b. Call 103/4.7.2019 "Support to Researchers with emphasis on Young Researchers – 2nd Call" with a total budget of €25.13million

    The above calls require young researchers or PhD holders to participate in a small scale, i.e. 15 month long, research project with more senior researchers and / or faculty members so that they improve their research skills and therefore improve their prospects for following a career in research.

Moreover, researchers in REMTh were also eligible for applying for research scholarships funded by OP HRDELL and administered by the National Scholarship Foundation[18] with a total budget of €6.7million, but details are not available for these.

Horizon2020

According to the S3 Platform ESIF Viewer tool[19], in the period from 2014 to 2020 (updated October 2020), the region of Eastern Macedonia and Thrace has benefited from 6.82 million of Euro contribution with 44 participations. The Democritus University of Thrace is the most active regional partner in the region, with the highest number of projects and financial contribution from Horizon 2020, with 51.76% of total contribution of the region, which corresponds to 20 funded projects and 3.53 million of Euro. This is followed by the private sector with 31% of total funding with 14 participations.

[18] See https://www.iky.gr/el/upotrofies-gr/didaktoriko/espa-2014

[19] The ESIF Viewer tool provides a structured, regionalised visualisation (at NUTS levels 1, 2 and 3) of two sets of data: the Horizon 2020 funding awarded to the participants of projects sourced from the DG R&I Grant database (as of October 2019) and the allocated R&I-related investments under the European structural and investment funds (ESIF).
See: https://s3platform.jrc.ec.europa.eu/synergies-tool

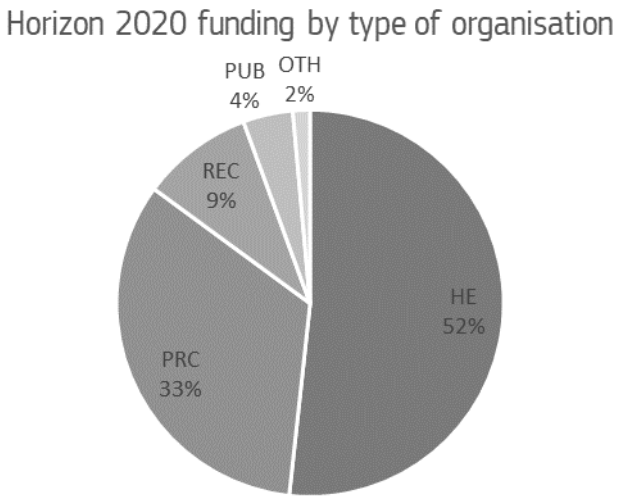

Figure 144 REMTh EU Contribution by type of organisation

In terms of distribution the funding from Horizon 2020 type of activities, as shown below (Figure 15), the areas in which higher education is capturing more funding are Secure, Clean and Efficient Energy (18.20%), Information and Communication Technologies (11.53%), Food security, Sustainable agriculture and forestry (9.73%) and Advanced manufacturing and processing (8.545%) thematic areas.

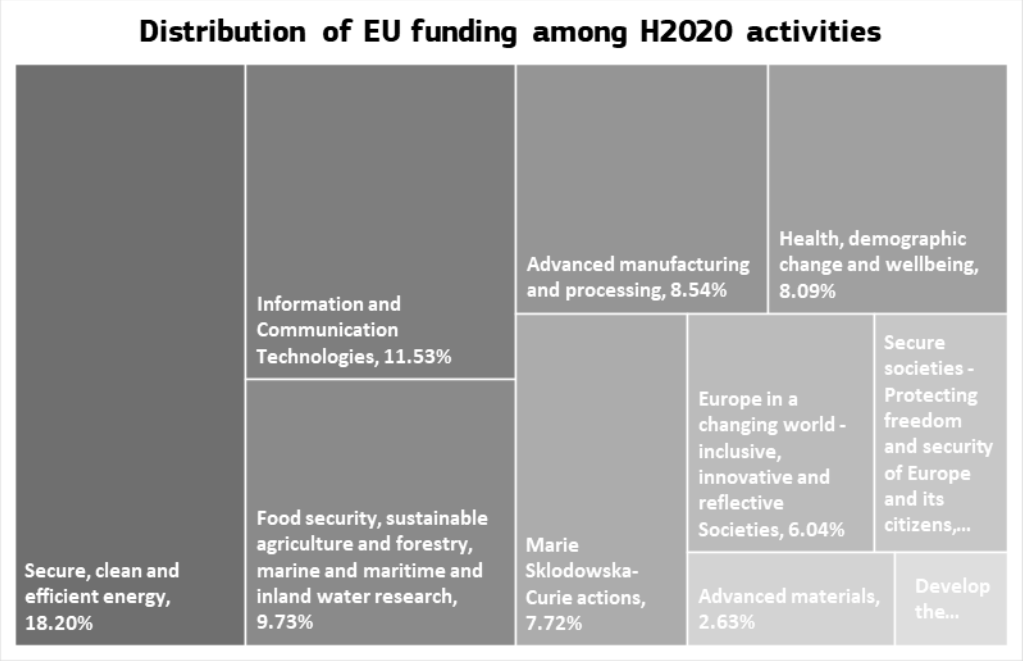

Figure 155 REMTh Distribution of EU funding among Horizon 2020 activities

According to the same data source, the Democritus University of Thrace is most usually a participant in EU projects, with 1 coordinated project out of 20, and project partners coming from outside the region, mainly Athens and Thessaloniki, or the European Union. The EU collaborators are mainly from UK, Belgium, Netherlands, Germany, Italy, Czech Republic and Hungary. Therefore, we observe that in the case of Eastern

Macedonia, even the university has good EU networks and partners, this is not accompanied by a leverage effect in partnering with other regional actors to collaborate internationally. Moreover, if we observe the projects with DUTH participation, collaborations are sought with research organisations around Athens or Thessaloniki area.

If we compare the participation with the one of other peer regions in Greece such as Thessaly (EL61) and Epirus (EL54) using the same data source, we find that Eastern Macedonia and Thrace is underperforming in Horizon 2020 participation. The region of Thessaly has 105 participations with 25.03 million of Euro contribution, and Epirus 75 participations and 25.88 million of Euro.

The aggregate numbers for Greece for the same period are 1.622 mil of Euro net EU contribution, with 5030 participations. Therefore, the total Horizon 2020 funding captured by the region is of 0.4% of the Greek total.

6 Fieldwork results

When this case study was being designed, the members of the RRIC suggested that there is considerable potential for further engagement of the regional HEIs in the regional RIS3 of Eastern Macedonia and Thrace, both in terms of strategy development and in terms of implementation and creation of impact. They have seen this case as an opportunity to re-introduce the transformative role of HEI/PROs in shaping place-based development strategies, re-initiate the stakeholder dialogue, realign the individual development visions, bring to light issues that inhibited performance and thus eventually address them. They were right.

The evidence collected during the fieldwork suggests that the regional HEIs in Eastern Macedonia-Thrace do not seem to provide opportunities for the society of which they form part in terms of growth, lifelong learning, business development and place building. Worryingly, they do not seem to have a plan for doing so, and it is still unclear whether the persons in their higher management are aware of their institutions' potential for regional transformation.

The premise of HEIs being critical regional assets and their resources, if successfully mobilised, can have a disproportionately positive effect on their regional economy and achievement of comprehensive regional strategy does not seem to have worked in REMTh, either in terms of mobilisation or in terms of effects. Unfortunately, the other stakeholders are not able to push the HEIs into the right direction since their expectations of them are also limited. To cite Goddard (2011), REMTh seems to be a 'disconnected region'. The key findings of the field survey are summarised below.

6.1 Major social, economic and development challenges faced by the Region

To elaborate a coherent development strategy, the stakeholders must have a common understanding of the main social, economic and development challenges. The interviews have indicated four main challenges: (i) a poor, underdeveloped and mostly unattractive region suffering from its (ii) remoteness and (iii) overdependence on low-tech/low-productivity sectors, (iv) being unable to integrate its multicultural population for the last 100 years. The consequences of remoteness and unattractiveness are loss of local talent, poor performance in creating high-quality jobs and thus shortage of skilled and experienced human resources, thus creating a vicious cycle for regional development. From the perspective of the regional government, the only way to collectively address these challenges is entrepreneurial development to create jobs and growth opportunities, and a gradual transition towards knowledge-intensive industry and services. Worryingly, the remaining stakeholders that were interviewed did not articulate any plausible approaches and their institutional role in them.

6.2 Balancing the HEIs' global and local engagement

The (national) legal framework that regulates hiring and promoting faculty members does not stimulate local engagement. Although university management encourages local engagement, it has not deployed any policies or mechanisms or budget towards this objective. Therefore, it's up to the self-motivation of faculty members to pursue such engagement(s). From the perspective of HEI faculty, the RIS3 approach of directing funding towards applied research in regional priority areas is correct; however more funding mechanisms should be mobilised beyond the regional OP and the scope of support should be extended beyond applied research using all the available means such as targeted calls for research, new academic chairs, new research labs, centres of excellence and research grant portability schemes.

6.3 Skills/capacities of graduates that are most valued by local employers:

DUTH shared a recent (2019) report drafted by the Careers Office that examines the career paths of the cohort of students that graduated in 2012 and in 2013. Unfortunately, this report does not collect information regarding the loci of employment. Therefore, information on skills/capacities valued by local employers are mostly circumstantial. From the perspective of HEI faculty, talented graduates are leaving the region, either to

continue their studies or to find their first jobs. DUTH faculty face problems in attracting young researchers (PhD candidates or/and PostDocs) for various research projects, sometimes having to pay more than the nation-wide norms just to fill their vacant positions. From the perspective of businesses, the interviews raise three major issues:

a) the recent restructuring of the HEI landscape in Greece is expected to create a void for middle-level technical professions that cannot be covered by secondary and post-secondary vocational schools;

b) technically oriented companies are actively exploiting all available mechanisms to source talent in the form of placements or internships; in some cases, they fully pay the cost of such schemes;

c) young university graduates need extra (company-provided) training, in some cases 3 years long to be integrated into their workflows.

The overall impression is, quoting one of the responses, that "the local HEIs do not have either the funds or the attractiveness that would make them a destination of choice for talent (students, researchers, faculty). There's an ambient misery in the institutions, which is the outcome of a blame game for limited funding".

6.4 RIS3 Design and Governance

The identification of the regional research and knowledge strengths/assets was based on a thorough, data-driven process that took into account relevant data (publications, patents, projects) in the period from 2000 to 2012. These were validated by the regional HEIs in September 2013. The capacities of the HEIs, in terms of both their provision of education and training and their scientific and technological capabilities, have also been considered for the final selection of the RIS3 priorities and objectives. However, although HEIs were involved from day one in the development of the regional S3, the interviews have indicated some issues regarding the fitness for purpose of the HEI participants, especially when RRIC membership is concerned. Participation of regional HEI faculty in the EDP does not seem to have been a product of a well organised and coordinated process, thus leaving ample space to researchers from other extra regional HEIs to jump in. The interviewees suggested that key improvements in future instances of the EDP should include early scheduling, draft agenda sharing, expressions of interest for participation to all faculty members and more transparency in the selection of the keynote speakers and other contributors, The regional S3 monitoring system is not yet deployed, and no inputs were asked from the HEIs regarding key performance, result and input indicators. The interviewees have not seen any monitoring information so far. Worryingly, no interviewee could recall any case that could be considered as evidence of the regional HEIs attempt to lead the regional S3 in any part of its life cycle or contribute to the development of leadership capacity among other stakeholders. DUTH's Centre for Life-long Learning and the Business Incubators are two very recent initiatives that could foster stakeholder cooperation to address real and pressing regional needs through collaborative 'university product' development. It would be premature to make a definite assessment of both. Although student internships and industrial PhDs are not formally in the regional policy mix, regional enterprises have found alternative paths to obtain the same results. Finally, the visibility of the HEI leadership in spearheading and supporting the RIS3 process was so far very low. Until now, S3 governance structure is underperforming with the root causes being several crises both in the Regional Administration and in DUTH. The law that institutionalised the RRICs did not help (unclear mandate, majority of researchers instead of businesspersons). There appear to be several differences in the way the two regional HEIs understand their role in supporting regional development. REMTh was the only region in Greece where the regional Technological Educational Institute did not merge with the regional University in 2017 and this is a proxy measure of the relationships between HEI administrators.

6.5 Current contribution of HEIs to RIS3

Although the selected RIS3 priorities are in line with the research and teaching strengths of the regional HEIs, the centralised structure of higher education in Greece inhibits any attempt to adapt curricula with the regional demands. There is evidence to suggest that some departments of the regional HEIs, such as the Department of Rural Development and the Department of Electrical Engineering, tried such adaptations, to no

effect until now. From the perspective of HEI faculty, the only way to develop scientific capabilities in fields of particular regional interest would be to channel EU funds to this purpose.

The battle for talent has three fronts: high-school graduates that have finished their university entrance exams, young graduates / post-docs and faculty members. The regional HEIs seem to be losing on all three fronts. On the first front, the regional HEIs compete with all other Greek HEIs for talented 18-year olds. The remoteness and unattractiveness of Eastern Macedonia-Thrace and the relative strength of its HEI brands reduce the odds for high-performing students to choose to study in the region. They usually do so when there is no other choice. University management considers any move to open the market for higher education beyond publicly funded HEIs as an existential treat that would minimise the inflows of first-year university students. As discussed earlier, most research-intensive departments and labs face significant difficulties for filling junior research positions (PhD candidates or Post-Docs) even if funding is available and higher wages are offered. Finally, the picture is mixed with respect to hiring new faculty members. Although the minimum requirements are set by Law and the number of positions are set by the Ministry of Education, each department seems to have its own hiring standards. DUTH itself has the highest turnover rate among Greek HEIs, most probably because newly hired faculty members, especially in social sciences and humanities, see their appointment as an opportunity to move to more prestigious (and central) HEIs. In such cases, for obvious reasons, the self-motivation for local engagement is rather limited. This does not apply to positions in the research-intensive Schools of Medicine and Engineering where building labs and research teams requires time and commitment. The Vice-Rector of DUTH mentioned that approximately 50% of DUTH's faculty members do not have permanent residence in Eastern Macedonia-Thrace. It is unclear whether typical instruments to improve researchers living and working conditions and work/life balance would help address this issue.

Beyond the ROP-supported business incubators, a project initially conceived by the regional Chambers of Commerce with HEIs supporting the idea and eventually asking to set two such incubators in their premises, there is no other activity to suggest that regional HEIs provide services specifically targeted at firms in priority areas. On the contrary, several HEI organisational units that are relevant to the third mission (i.e., Technology Transfer Office, Careers Office, H2020 Project Development Support Office) have drastically reduced their operations or ceased to exist due to budget cuts, funding gaps between successive programming periods and lack of skilled human resources. The consensus among all types of stakeholders that were interviewed is that DUTH is not addressing its' third mission in a systematic manner, although relevant policies for doing so are already in place (i.e., technology transfer and IPR). In the absence of a systematic, university-wide approach, some research-intensive departments such as Electrical Engineering and Molecular Biology-Genetics seem to have taken their own initiatives in building and maintaining two-way stakeholder interactions. The Industry (Advisory) Committee established in mid-2020 by the Department of Electrical Engineering to assist the Department in their planning for skills (curriculum), research, and technology transfer so they can foster their relationship with the industry and provide employment opportunities to their graduates is an example that, if successful, can be considered for wider deployment.

The stakeholders seem to be happy with the funding instruments that have been put in action by the National OPs for Thematic Objective 1 (TO1), citing only improper timing and lack of call scheduling as their main concerns. The OP Rural Development was very late in launching their TO1 calls (the so-called Measure 16), and the time between calls and contracts was over 2.5 years, thus creating delays in RIS3 implementation in Agro-food, the key regional S3 priority. Regional tensions seem to have emerged between HEIs and the regional Managing Authority, following the choice of the latter to use a single instrument for TO1 (R&D&I actions for enterprises, with HEIs being subcontractors). For reasons that remain unclear so far, the regional calls did not meet the participation expectations of the Managing Authority. Moreover, several drastic budget cuts in the selected projects increased the tensions among the direct (enterprises) and the indirect (HEIs) beneficiaries. From the perspective of HEI faculty, the TO1 regional budgets should be increased but managed centrally, innovation vouchers should be introduced (there were explicitly mentioned in the ROP text but somehow not implemented) and intersectoral mobility schemes such as Industrial PhDs and Knowledge Transfer Partnerships should be put in the regional policy mix. Finally, a Regional Research Centre, much bigger and broader than Athena Research Centre's Xanthi Chapter should be the objective for the next

programming period. From the perspective of the enterprise sector, the key elements that are missing from the regional RIS3 are agility, speed of execution and creating market opportunities for new products, i.e. by public purchase of innovation type of projects. The latter is still missing both at the regional and at the national level.

6.6 HEI competitiveness in attracting funding from all available sources

From the perspective of HEI administrators and faculty, DUTH is performing rather well in attracting competitive funding from national sources. It could be higher, according to one interviewee, if regional businesses were more active in pursuing such funds. However, regarding EU funding (i.e., Horizon2020), both the region as a whole and DUTH are lagging in performance versus the peer Greek regions of Epirus and Thessaly. The main reasons given to explain this are the geographic dispersion of DUTH's departments, the introvert character of the university, the lack of ambition shared by many faculty members and the lack of coordinated support by the University.

6.7 Barriers and gaps

According to the interviewees, there seems to be a consensus on the main barriers for HEIs and other stakeholders to work together in the development of the RIS3. The recurring issues that have been reiterated by most interviewees in their own words are unclear joint long-term development objectives, ineffective leadership throughout the triple helix, misalignment of stakeholder interests, non-overlapping institutional agendas, and no attempts to empathise with other stakeholder groups. "Business as usual for all parties", as put by one of the interviewees, seems to be the norm; co-operation is rather ad hoc, when fitting with joint short-term interests. All of these have created unmet expectations among the three strands of the triple helix that consume quickly the social capital built back in 2013. In this context, any discussion on the main capabilities of HEIs not currently being fully mobilized to address regional innovation resource or capability gaps is rather irrelevant since leadership, institutions and networks are weak. Learning from best practices (i.e. the Region of Crete was mentioned twice as such in the context of Greek RIS3s) might help stakeholders both raise their expectations and ask for change and also, more importantly, improve their institutional agendas. However, the status quo in the region seems to inhibit changes.

6.8 Lessons learnt and future role of HEIs in RIS3

Seven years after the launch of the RIS3 process in Eastern Macedonia and Thrace several key lessons seem to have been absorbed:

- The need for political commitment and support by the Regional Government as essential enabler for success in all stages of the RIS3 life cycle.
- The need for effective leadership at the highest level within the key institutional actors.
- The need for appropriately designed organisational structures and a clear definition of a governance model to drive the RIS3 forward. The three-tier model proposed by the EU Guide has to be adapted to the local context, clear responsibilities should be assigned and people with the right social status, experience and personal competencies should be involved. Their knowledge should be transferred to the organisational structures, so the latter can become sustainable.
- The need for the Regional Government to provide the governance structure with trust and apply accountability rules.
- The need for ownership of the tasks in the action plan, following a negotiated stakeholders' model of regional development.
- The need of balancing the visionary and inspirational nature of the RIS3 with practicality, feasibility, achievability, and agility.

- The need for improving the dynamic character of the RIS3 by monitoring and frequent reviews.
- The critical importance of awareness raising, not only to inform the regional population on the impacts of the RIS3, but also to identify the key players and potential partners and engage their commitment.
- The need to involve more stakeholder groups in peer learning to drive change among institutional stakeholders. Learning from other regions can play a key role in developing competence and in securing achievements.

7 Conclusions and policy recommendations

Eastern Macedonia and Thrace seems to be in a better position in most of the context indicators that measure smart growth since 2014, i.e. the start of the current programming period. However, the long-term structural weaknesses of regional economy are still present, thus inhibiting a strong rebound after the financial crisis of 2009 and the recession that followed. So far, the regional economy has not managed to catch-up with the national growth trends and moreover, its structure does not seem to move towards knowledge-intensive activities.

The gross regional expenditure on R&D (GERD), the headline indicator for smart growth in Europe2020 strategy, has increased by 14% since 2013. However, this was not enough to catch up with the value of this indicator at the national level, which increased by 39% in the same period. Therefore, the region's relative position with respect to Greece and EU28 remains mostly the same as in 2013.

According to the last EU Regional Competitive Index of 2019, Eastern Macedonia and Thrace's is ranked 12th among the 13 Greek Regions and 265th among the 268 EU regions, with its ranking being consistently in the lowest positions among EU28 regions since the first EU Regional Competitiveness Index in 2010.

In this context, the persistent problem of how the regional higher education institutions can contribute to raising regional competitiveness and to developing a more sustainable and inclusive society remains current. Whilst regional policy actors see HEIs as being critical for the delivery of their regional innovation goals, HEIs themselves do not necessarily see the region as vital for their own survival. Within the Greek higher education system, HEIs face many challenges in competing to attract talented faculty, researchers and students, to get highly competitive research funding and to address their infrastructure needs and operational expenses with ever-declining budgets of institutional funding. The legal framework in Greece that regulates faculty promotions and funding in HEIs neither encourages nor rewards regional engagement activities and therefore, they are considered as being less rigorous and less worthy than excellent research. Therefore, even if regional development is included in the HEI's mission, de facto continual disincentives to prioritise regional engagement are in place and other priorities are adopted in practice by HEIs.

This research has already documented that despite these tensions, the regional HEIs have been participating, at various degrees, in the design, governance and implementation of the regional smart specialisation strategy. By the end of 2019, they have been direct beneficiaries in projects worth more than €90million of ESIF and national funds, of which 60% from the regional operational programme. They have also been valuable nodes in wider, inter-regional networks that help a small, but highly active, group of regional enterprises to access, absorb and put into use new knowledge. Finally, they have used many opportunities available, mainly at the national level, to create new jobs for researchers in the region, thus raising some barriers to brain-drain and extending the regional research endowment.

However, despite these achievements, there seems to be considerable room for improvement. First, given the absence of a stakeholder consensus for long-term development objectives in the Region, DUTH, the single truly regional university, has a golden opportunity to initiate such a dialogue and provide evidence and models on appropriate choices and their impact. This would require inter-departmental cooperation beyond the highly technical Schools or Departments that have already participated in the implementation of the regional S3: social sciences, especially Economics, and even humanities should also be a part of the visioning and prioritization processes. Second, the regional HEIs and especially DUTH, should clearly define their expected contribution in the regional development scenarios and become more systematic in terms of policies and methods, both for stakeholder engagement and for mobilizing their faculty for this purpose. Third, the regional HEIs should consider all the available options to stimulate and support the widest possible participation in national and international research networks and thus demonstrate their research capacity, and inverse the introvert behaviours of (the majority of) their faculty members.

The case study has answered the research questions as follows:

Which were the objectives and motives for HEIs/PROs to contribute to the regional S3?

From the institutional perspective, it seems that the regional HEIs/PROs participated in the design of the regional S3 to make sure that the regional ESIF budget allocation would serve their urgent needs for infrastructure and facilities and also maximise research project funding opportunities. Given the circumstances and the context for HE funding in Greece (as discussed in section 4), this was a fair motive. However, once priorities and budgets were decided, and the first calls were launched, their interest in the governance of the regional S3 declined, despite their majority vote in the Regional Research and Innovation Council. Beyond implementing research projects of various types, their only significant contribution after that,

having an important role in their 'third mission', was the design of the regional incubator scheme. It is clear that HEI management was not effective in raising awareness among faculty members on the challenges and the stakes related to the regional S3 and in mobilising their participation, especially in the EDP process. However, several individual faculty members, driven by self-motivation and existing linkages to the industry, have managed to participate in various capacities. Most of them are unhappy with the outcome given the effort spent. Moreover, several research-intensive DUTH departments have chosen to pursue formal network-building with the industry and thus compensate for the apparent lack of such mechanisms at the institution level.

Which are the most suitable effectiveness criteria for HEI/PRO contributions to the regional S3?

The four mechanisms by which HEIs can contribute to regional development proposed by Goddard (2011), i.e. research activities to enhance regional innovation; promoting enterprise, business development and growth; development of the regional human capital and skills and community development; and place building and his ranking of their transformative character are a good starting point to assess the effectiveness of HEI contribution to the S3. If coupled with Kempton et al. (2013) five areas where HEIs can contribute in the context of a regional S3 (leadership, promoting collaborations, creating absorptive capacity, establishing linkages to other relevant knowledge sources, promotion of policy learning) they can set a complete framework for assessment. All the above were considered in the design of the research instrument used for this case study.

To which extent the above effectiveness criteria have been met?

The evidence we have collected suggests that:

a. In terms of research activities to enhance regional innovation the local HEIs/PROs were rather successful in participating in nation-wide collaborative research projects and in regional contract research projects and very successful in national research infrastructures. Our interviewees agreed that performance in attracting research funding through the above instruments was good. However, the network analysis of the research collaborations (see Figure 10 on p.26) indicates that none of the regional HEIs are central in the network, and this means that regional enterprises tend to seek extra-regional scientific expertise to source knowledge. This agrees with our interviewees' opinions that DUTH has not demonstrated its capabilities to the regional actors. The limited number policy instruments that were employed was beyond the influence of HEIs. The creation of a regional research centre, a key objective of DUTH for many years, seems that cannot gain friction at the decision-making centres.

b. In terms of promoting a more entrepreneurial culture (especially among students and graduates), efforts to stimulate business start-ups among graduates and staff, and measures which help build a more favourable business environment for both new and existing firms, there is not much to claim from the HEI side except the recently launched business incubators.

c. In terms of developing and re-skilling the regional human capital, we note the potential created by the operation of DUTH's Lifelong Learning Centre[20], which is still at an early stage of development and therefore, its impact is yet to be proved, since there are no quantitative data available. In principle, both regional HEIs attract students from all over Greece and therefore, they cannot be characterized as regional from this perspective. Therefore, moving beyond traditional delivery models to tools such as distance learning, on-site teaching, modular programme design, new approaches to accreditation and better use of private sector in design and delivery of training programmes should be considered, but there's no evidence that this actually happens at this moment. Finally, as indicated from the evidence collected through the interviews, the regional HEIs are losing the battle of talent attraction at all fronts, despite their efforts.

d. In terms of community development and place building, the evidence suggests that this is not in the agenda of the regional HEIs.

e. Finally, in terms of leadership in various aspects related to the S3 and in establishing linkages to relevant, for the local industry, knowledge sources the evidence suggests that the results are mixed: although the regional HEIs did introduce a considerable share of regional SMEs to

[20] See https://kedivim.duth.gr/en/the-department/

mostly national research networks, their leadership in S3 and in developing the capabilities of other regional stakeholders were minimal.

Which factors influenced the effectiveness of HEIs/PROs contribution to S3?

Based on the feedback collected from the interviews, we classify the root causes that were claimed to affect the contribution of HEIs/PROs to the regional S3 into four types of factors and discuss their importance.

External / Contextual factors.

i. *Location, geographic remoteness*. Despite more than 30 years of ESIF spending in infrastructure, Eastern Macedonia-Thrace is still a poor, underdeveloped and mostly unattractive border region suffering from its remoteness. This affects its ability to attract and retain talent, limits its influence on the major decision-making centres and inhibits competitive access to global knowledge and trade networks, thus increasing introvert behaviour by all stakeholders.

ii. *Legislation.* The means available to the Region to reverse its long-term structural weaknesses are constrained by the horizontal development policies designed at the national level, which seem to be mostly ineffective. Specifically for HEIs, although their 'third mission' is by national law part of their mission statement, there is no evidence to suggest that attainment of this objective is further addressed in HEI performance reviews, funding criteria and faculty hiring / promotion regulations.

iii. *Structure of the local economy.* REMTh's overdependence on low-tech/low-productivity sectors affects the propensity of the majority of regional businesses to engage with HEIs in a proactive manner, despite the breadth of relevant disciplines supported by the regional HEIs. The size of the ecosystem of research active enterprises, estimated using participation to the most significant national funding programme of this period, is very low.

Financial factors.

i. *Breadth of policy instruments and their budgets*. The majority of the policy instruments (and the respective budgets) that were available to the Region for smart growth and for skills/training are designed and managed at the national level, thus not being tailored to the regional needs and to the regional context. A single policy instrument was launched at the regional level, and although its rationale was rather clear, it could not support the needs of a wider regional enterprise population. Moreover, from the perspective of HEI faculty members, the regional policy mix should have been more diverse to cover both a wider enterprise population and the orientation of HEI research to the local needs.

ii. *Availability of funding*. The severe fiscal limitations of the period between 2008 and 2018 have affected all aspects of non-core HEI activities and infrastructure, including maintaining faculty and administrative jobs that remained vacant when staff retired.

Organisational factors.

i. *Collective governance*. The evidence suggests that the regional government is rather weak in formulating a clear regional development vision and pursue its achievement by mobilising other regional actors to formulate effective strategies or influence decision making at a national level, and thus maintain coherence and coordination between national 'top down' and local 'bottom up' policies and initiatives. This weakness is further expressed as lack of trust towards the organisational structures introduced to support the S3 process in the Region (i.e., the RRIC) and as lack of political commitment and support to the regional S3. Unfortunately, so far, no stakeholder group (including the regional HEIs) was able to break this vicious cycle and facilitate the alignment the interests of regional actors towards mutually agreed regional development objectives. The region could greatly benefit from a stronger leadership of HEIs, building a common vision on the main regional challenges and a long-term strategy to contribute from their three missions, connecting the innovation system stakeholders.

ii. *HEI vision and strategy*. From the side of HEIs, there is no strong central management working to achieve a defined vision and strategy, both for the development of the HEIs themselves and, from a wider perspective, for the HEIs role in support of regional development. Until today, the HEIs strategies are the sum of the individual strategies of their (senior) faculty members, on the basis of a jealously guarded academic autonomy. Some departments have reportedly tried to address this issue by engaging other stakeholders by themselves, but such attempts are rather ad hoc and time-bounded, suffering from the lack of authority in terms of institutional support.

iii. *HEI policies, processes, and organisational structures*. DUTH, the major regional HEI, seems to have elaborated a research strategy and the organizational structures to support it[21], some of them being closely related to the 'third mission'. However, monitoring indicators are lacking and therefore, for external stakeholders, the University's research strategy is an exercise on paper rather than a systematically managed process. Moreover, it is unclear whether investing more money in the organizational structures that support the university's third mission would create concrete results for the region, or not. On the contrary, many interviewees indicated that critical organizational structures are underfunded and understaffed, thus failing to perform.

iv. *Intra-regional dispersion of HEI campuses*. The dispersion of HEI campuses across the region does not seem to be supported by a strong academic or research rationale. On the contrary, many interviewees claimed that it is the main reason of underperformance in national and European competitive research funding programmes.

Human resource related factors.

i. *Lack of qualified personnel*. From the perspective of HEI management, the institutions' inability to hire qualified personnel in the region to support mission-critical organisational departments is a direct result of the region's geographic position and its unattractiveness as a place to live. One could argue that HEIs' staff development and leadership processes are in need of an urgent review. The partnership of the HEIs and the region to retain and attract talent is key. There is a potential to create a pool of young talent that feels attracted to stay and live in the region, if more clear professional paths and opportunities are provided in collaboration with industry. Funding schemes such as Industrial PhDs or introducing in the curricula collaborative projects based on challenges for students can be an interesting mechanism.

ii. *Personal traits of faculty members*. "Lack of ambition" among faculty members was mentioned as one of the causes that contribute to underperformance in national and European competitive research funding programmes. There are interesting incentive schemes that could be put in place by the region and the HEIs for the promotion of faculty members, encouraging collaborations with companies or social partners as part of their activities.

Building on the evidence and the conclusions above, this report identifies actions in five main areas to enhance and improve the contribution of the regional universities to Eastern Macedonia-Thrace's Smart Specialisation Strategy:

1. Address institutional issues related to HEI third mission and multilevel Governance.

This set of policy recommendations is addressed to the national authorities responsible for higher education and research:

a. *Institutionalize HEIs' third mission*. Although contribution to regional development is by law a part of the mission of Greek HEIs, this perspective is neither operationalized by HEIs in their strategies nor monitored and assessed by both HEIs and the Hellenic Authority for Higher Education[22]. Putting this dimension on the map would require major amendments on the regulations governing quality assessment of higher education, including developing key performance indicators. A further step would be partially linking institutional funding to the performance across this dimension.

b. The partnership between regional administration and HEIs manager seems to have important room for improvement. *Facilitating a space for dialogue*, e.g. by operationalizing establishes the so called Academic Councils of Higher Education and Research that have already been introduced by Art 49 of Law 4485/2017, could help define strategic lines of action and a consensus around the main challenges for regional growth and innovation and the role of HEIs to contribute to it.

c. *Decentralise the design of education, skills provision and lifelong learning ESIF-funded programmes to match regional or local market needs*, irrespective of how such programmes

[21] See http://duth.gr/%CE%88%CF%81%CE%B5%CF%85%CE%BD%CE%B1/%CE%A3%CF%84%CF%81%CE%B1%CF%84%CE%B7%CE%B3%CE%B9%CE%BA%CE%AE-%CE%88%CF%81%CE%B5%CF%85%CE%BD%CE%B1%CF%82

[22] Currently, HAHE tracks KPIs across the following dimensions: teaching/training, research and innovation, funding, human resources, infrastructure and services.

are managed and delivered. The same approach can also be considered for ESIF- or EU-funded programmes in support of talent development and retention and for reducing brain-drain.

d. *Provide technical assistance to reinforce skills of the regional administration personnel* to manage of EU funds and collaborative innovation programmes.

e. *Improve the functioning of the Regional Research and Innovation Councils* by providing a clear mandate by Law to transform them into effective steering groups for S3. Reconsider the balance between academics and industry in RRICs to make them more relevant in the context of S3 and institutionalize linkages to their regional and national peer entities.

2. Reinforce intersectoral governance and capacities of the regional actors.

This set of policy recommendations is addressed to the Regional Government and the key actors of the triple helix, including HEIs.

a. *S3 is still the best available tool to develop long-term, evidence- and place-based development strategies.* This must be communicated to the widest possible extent in the Region so that stakeholder engagement is achieved.

b. *The role of S3 monitoring as a tool to both manage the strategy and to build trust,* enable accountability and communicate performance should be central to any attempt of providing dynamic elements to the regional S3 and drive evidence-based collective decisions by the regional stakeholders. Involve regional stakeholders in the definition of development objectives and the corresponding indicators and target values, and elaborate action plans to meet those targets, rather than just monitoring budgets and expenditure. The HEIs expertise, particularly in the social-sciences field, on innovation processes, modelling and data processing could be considered for the S3 monitoring system. Building expertise in the region to monitor the S3 process could be inspired by other EU regions, such as the Basque Country or Northern Netherlands.

c. *Extend the variety of policy instruments that support university-industry collaboration by identifying relevant tools and adapting them to the regional context.* Provide agility by having open calls with regular application deadlines. The university-industry collaborations could be further promoted through the use of HE research infrastructures as spaces for innovative projects. The recently approved upgrading of DUTH infrastructures is a very good opportunity to promote the research services of HEIs and upgrade the innovation capabilities of companies, especially in the S3 priorities areas with weaker performance. In addition, the dispersion of DUTH can be viewed as an opportunity to better connect with the local network of businesses. Further promoting the role of business intermediary organisations within S3 could be also interesting to bridge companies needs with the research and innovation solutions from HEIs.

d. *Identify and involve experienced 'boundary spanners'* in the key governance structures of the regional S3 by applying stricter selection criteria than those imposed by law.

e. The key regional actors (Government, Chambers, HEIs) should design and implement a *strategic workforce planning on the basis of a rigorous competence assessment* of the existing capacity gaps and a clear distinction between the transactional and the transformational dimensions. Emphasis should be put on the latter, accompanied by incentives to address low salaries and the unattractive location of the region.

f. *Learning from other regions facing and solving similar problems can play a key role in developing competence and in securing achievements.* The key regional actors should actively pursue such learning opportunities in the form of peer learning networks, cross-border knowledge exchange projects, participation in thematic platforms, or even specially designed digital tools.

3. Redefine HEIs role in regional development.

This set of recommendations are addressed to the management of regional HEIs.

a. *Increase ambition and lead the regional transformation process.* According to DUTH's internal evaluation report published in 2016[23], the university had not prioritized its development objectives across the seven dimensions of its mission, with them being, at that time, subject to an ongoing internal consultation. The external evaluation report that followed this report[24] highlights a highly asymmetric relation between DUTH and the wider society, with DUTH being a net contributor to regional development. However, its claimed contributions, beyond the obvious multiplier effects of student expenditure, are largely unquantified. Simply writing a strategy for regional engagement and having it endorsed by university management is not enough to transform institutions, especially when the Region seems to be in a deadlock. Action should be taken in the following dimensions:

   i. Be proactive in setting the agenda on the parameters of the regional development strategy by using the HEIs' detailed knowledge of gaps and opportunities and also tools for scenario planning that are usually available to departments not currently involved in the RIS3, such as Economics.

   ii. Pursue triple helix networking to develop mutual trust, willingness of engagement and cooperation among partners, shared understanding of the challenges and the possible outcomes. Such networking provides the regional stakeholders with strategic capacities to manage the entire life cycle of the S3 process.

   iii. Exploit the HEIs' role as knowledge institutions to disseminate own research outcomes and broker knowledge through trans-regional links at the national and the international levels.

   iv. Self-commit on delivering specific, time-bound, measurable "HEI-related outcomes" that are relevant to regional development. In this regard, the HEIs can benefit from the HEInnovate initiative looking to develop entrepreneurial and innovative capacities of higher education and the recent HEInnovate Greece country review to explore ways to enhance their leadership capabilities for regional growth.

   v. Mobilise resources and use all interaction channels to promote a well-functioning entrepreneurial discovery process. The region could follow up on the capacity built during the early support provided the JRC on the Entrepreneurial Discovery Process, the Project Development Labs and governance working group. It constituted a good basis to define the tools and processes needed to ensure the continuous interaction between the regional stakeholders in the S3 priority areas.

b. *Consider a mission-oriented problem solving approach for the Region by building on the multidisciplinary character of the major regional HEI.* The region can get inspiration from other EU regions, such as the Northern Netherlands, which has defined a challenge driven S3 with a strong governance model to engage regional stakeholders to identify the main regional challenges and agree on concrete collective and individual actions to move forward.

c. *Strengthen the organizational structures that are directly involved in delivering the 'third mission',* such as the Special Accounts for Research Grants, the careers and technology transfer offices and the Innovation and Entrepreneurship Unit (MOKE). Be proactive and introduce staff development processes accompanied by creative incentives for staff with capacities and ambition.

4. Co-design of S3 instruments

[23] See section B.3.2, p. 17 in https://modip.duth.gr/wp-content/uploads/2020/05/duth_2015.pdf

[24] See section 3.1.8 in https://modip.duth.gr/wp-content/uploads/2020/05/%CE%88%CE%BA%CE%B8%CE%B5%CF%83%CE%B7-%CE%B5%CE%BE%CF%89%CF%84%CE%B5%CF%81%CE%B9%CE%BA%CE%AE%CF%82-%CE%B1%CE%BE%CE%B9%CE%BF%CE%BB%CF%8C%CE%B3%CE%B7%CF%83%CE%B7%CF%82-%CE%94%CE%A0%CE%98-%CE%99%CE%B1%CE%BD%CE%BF%CF%85%CE%AC%CF%81%CE%B9%CE%BF%CF%82-2016.pdf

The evidence collected indicate that the Eastern Macedonia and Thrace S3 is heavily dependent on the national Operational Programmes, with most policy instruments managed at the national level. The region could benefit from the design of more diverse and innovative funding instruments, considering the drivers of HEIs and the match with S3 priorities and the complementarity with the broader funding instruments landscape (Chavel et al., 2018). The introduction of a learning culture in the design and implementation of funding schemes, with a close cooperation with beneficiaries to understand what is working or could be improved would be very positive.

Even if the design of funding instruments should carefully consider the regional framework, there are interesting examples that can serve of inspiration to test and prototype new instruments. In view of the findings of the case study, the following ones are considered of interest:

- **Industrial PhD programme**

  The region of Navarre (Spain) identified the need of increasing the potential of employing the high level researchers in the regional economic landscape, valuing their knowledge and increasing the research capacity of the innovation system. The instrument of Industrial PhD was launched for the first time in 2016[25] to support the employment of doctoral students in local companies, in innovative projects of interest for the company and provided the research work is focused in the priority sectors of Navarre. The first call served to test the interest of the instruments and identify some related challenges, mainly due to the challenges related to the clash of cultures between university and companies and the need to ensure sustainability over time and sufficient funding. The outcomes from the HESS Navarre case study (Campillo et al., 2017) were considered by the region to identify ways to improve the instrument and co-design according to the main aspects raised by beneficiaries. As a result, the subsequent calls introduced as a novelty the alignment of the PhD candidate research project with the priority sectors, strategic technologies and challenges of the Navarre RIS3 as an evaluation criteria.

  In the four calls awarded so far, the funding scheme has supported the hiring of 53 doctoral students. The entity that hires the doctoral student agrees to a three-year contract, with a minimum salary of about 25,000 euros per year. The Government of Navarra covers this expense in a percentage that can range between 55 and 80% depending on the size of the company or if the doctoral student is a woman.

- **Attraction of talent**

  LE STUDIUM[26] is a regional agency that hires highly skilled international researchers to strengthen international scientific exchanges and attractiveness of the region of Centre Val de Loire (France). LE STUDIUM Programmes support the selection, recruitment and installation of highly qualified and skilled international researchers. An annual call is opened for Professorship, Consortium and Fellowship and Visiting Researchers applications which are evaluated by independent external peer reviewers and an independent Scientific Council. The selected candidates are placed in HEI and research institutes based in the region (University of Orleans, University of Tours, INSA Centre-Val de Loire, ESAD Orleans, National research centres (BRGM, CNRS, CEA Le Ripault, Center INRA Val de Loire, INSERM, IRSTEA) or Poles of Competitiveness (Cosmetic Valley, Elastopole, Dream, S2E2, Vegepolys). LE STUDIUM Fellows, Visiting Researchers and Professors receive full support with all logistics and administrative aspects (visa, residence permit, registration to social agencies, medical coverage, school for children, social and sports activities…) to welcome them and their family in exceptionally good conditions.

  The initiative is highly successful and a reference for other regions in Europe (Arregui-Pabollet et al., 2018), having attracted more than 170 researchers from North America, South America, Asia, Africa, Oceania and Europe, with 5% of researchers settling in the region after the end of the programme. Since 2015, LE STUDIUM benefits from a European Marie Skłodowska-

[25] Call for ´Industrial PhDs 2018-2020¨ of Navarre: http://www.navarra.es/home_es/servicios/ficha/6893/Ayudas-para-la-contratacion-de-doctorandos-y-doctorandas-por-empresas-y-organismos-de-investigacion-y-difusion-de-conocimientos-Doctorados-industriales-2018-2020

[26] http://www.lestudium-ias.com/about-us

Curie COFUND Action, that co-finances the regional funding, and substantially increases the visibility of the region and that of its broad regional network.

- **Challenge oriented S3 and Open Innovation laboratories**

  The Northern Netherlands has defined its S3 connecting it to societal challenges on health, food, water and sustainable energy (Benneworth et al., 2021). This has served to push for innovation processes that transcends sectors and clusters. As a response, the regional agency managing the S3 process SNN launched the Open Innovation funding scheme[27] looking to increase the interaction between business and knowledge centres. The call focuses on financing integrated initiatives that generate related innovation processes, particularly involving SMEs and end-users that contribute to innovation processes. No specific type of projects or type of activities are eligible for funding, but an open approach is followed seeking innovative ideas that strengthen the innovation climate and improve the innovation ecosystem. The scheme supports with 40% funding the eligible costs up to four years period. The ideas are selected based on their capacity on their innovation potential with clear market orientation that have a significant economic and societal impact in the Northern Netherlands.

  In addition the region is a good example of HEI creation of infrastructures that work as innovation workplaces and hubs across the region, that bring together networks of firms, teachers, researchers and business to support open innovation communities that work around knowledge applications and innovations (Benneworth et al., 2021).

5. Learning through international partnerships

The evidence collected show the very low participation in Horizon 2020, the lack of leverage effect of the higher education networks to engage other regional stakeholders as partners and the low capacity to coordinate European project consortia. However, the projects in which DUTH is participating show a quite extensive network of partners from a wide range of EU countries, with quite good match with the S3 priority areas.

The following recommendations are targeted to regional authorities and higher education institutions managers:

a. *Continuing with the project development lab experience,* building capacity to identify innovative projects at regional scale partnership, that can be scaled up and explore the potential to partner with other EU regions to access to EU funding programmes (Horizon 2020, Interreg, Erasmus+, etc)

b. *Intermediary bodies to support learning processes in EU partnership.* The role of intermediary bodies can be very relevant in supporting the access to international partners, building consortia, and raising awareness of the available EU funding opportunities.

c. The cuts of HE funding make difficult to set up a *European projects office to support university researchers' access to EU funding.* However, the region could benefit from implementing a voucher scheme similar to the one launched at the time by the Spanish Ministry to boost the participation in FP6, which proved to be very successful in a context with limited capacity and experience to access EU programmes. The scheme supports the subcontracting of expertise to support in the preparation of EU proposals in response to EU calls, as well as integrating EU projects expertise in organisations.

d. Strategic discussions in the S3 working groups to *integrate the results of the ongoing EU projects results* in the regional context, and benefit from the learning to define future priority areas and projects.

e. *Promote the HE leadership in strategic EU initiatives*, such as the HEInnovate initiative[28] boosting the innovation and entrepreneurial capacity of higher education, the Knowledge Alliances and European

[27] https://www.snn.nl/sites/subsidie/files/2018-11/Open%20Innovation%20Call.pdf

[28] HEInnovate is an initiative of the European Commission's DG Education and Culture in partnership with the OECD promoting the innovation and entrepreneurship capacity of higher education. More information: https://heinnovate.eu/en

Universities[29] partnerships, funded under Erasmus+ Programme, contributing to regional innovation ecosystems, or the Regional Innovation Scheme of the European Institute of Technology- Knowledge and Innovation Communities[30] supporting collaborations in the knowledge triangle and contributing to integrate education into innovation university-business partnerships.

[29] Erasmus+ Knowledge Alliances support transnational and result-driven activities between higher education institutions and businesses bringing new approaches to learning and training. More information: https://ec.europa.eu/programmes/erasmus-plus/opportunities/knowledge-alliances_en

Erasmus+ European Universities networks trigger unprecedented levels of institutionalised cooperation between higher education institutions, making it systemic, structural and sustainable. More information: https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

[30] https://eit.europa.eu/our-activities/eit-regional-innovation-scheme-ris

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Glossary

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Annexes

Annex 1. List of interviewees

Contact	Position	Organisation type
Vassilis Dasteridis	CEO	Dasteri Systems and Member of the Board of the Hellenic Association of Industries
Prof. Marirena Grigoriou	Professor Department of Molecular Biology and Genetics.	Democritus University of Thrace
Kyriakos Kampakas	CEO	Kampakas Metallurgy
Yannis Kessanlis	Officer	Managing Authority of the Regional Operational Programme
Panagiotis Koudoumakis	Head of Programming and Evaluation Unit	Managing Authority of the Regional Operational Programme
Prof. Yannis Kourkoutas	Professor Department of Molecular Biology and Genetics.	Democritus University of Thrace
Prof. Maria Michalopoulou	Vice Rector for Research	Democritus University of Thrace
Prof. Pantelis N. Botsaris	Chair	Regional Research and Innovation Council of Eastern Macedonia and Thrace
Prof. Nikos Papanikolaou	Professor Department of Electrical Engineering	Democritus University of Thrace
Vassilis Pitsinigkos	Director	Managing Authority of the Regional Operational Programme
Petros Soukoulias	Vice-Chair	Regional Research and Innovation Council of Eastern Macedonia and Thrace
Prof. Zissis Vryzas	Professor Department of Agricultural Development	Democritus University of Thrace

Annex 2. Final event speakers

Eskarne Arregui, European Commission, Joint Research Centre

Mark Boden, European Commission, Joint Research Centre

Prof. Pantelis N. Botsaris, Regional Research and Innovation Council Eastern Macedonia and Thrace

Christos Dimas, Deputy Minister of Development and Investments, Responsible for Research and Innovation

Luc Hulsman, SNN Northern Netherlands

Lina Ioannou, Ministry of Education and Religious Affairs, Greece

Athanasios Kyriazis, Secretary General for Research and Innovation

Prof. Maria Michalopoulou, Democritus University of Thrace

Joerg Niehoff, European Commission, DG Education, Youth, Sport and Culture

Maria Palladino, European Commission, DG Education, Youth, Sport and Culture

Angelos Syrigos, Deputy Minister of Education and Religious Affairs, Responsible for Higher Education

Agni Spilioti, General Secretariat for Research and Innovation of the Ministry of Development and Investments, Greece

Yannis Tolias, Expert appointed by the European Commission

Raffaele Trapasso, OECD, Centre for Entrepreneurship, SMEs, Cities and Regions

Annex 4. Interview questions

Part I - General questions

1. (ALL) In your opinion, which are the major social, economic and development challenges faced by the Region today? How have these evolved over time?

2. (HEI/PRO) How can the university global perspective/local engagement be balanced? Should the university be more focused on regional/local priorities or on responding to global challenges and play a key role at international level?

3. (ALL) Which are the skills/capacities of graduates that are most valued by employers in REMTh? How do you expect them to evolve in the next decade given the global impulses (e.g., decarbonisation and digitisation)?

4. (HEI/PRO) Do you think that evaluation mechanisms for university professors and researchers' performance are contributing to more university-region engagement? Is there something that must change in this respect? Who must lead the changes?

Part II – Alignment of HEI to RIS3

RIS3 design and governance

5. (ALL) Did the HEI play a proactive involvement in the RIS3 in identifying the region's research and knowledge strengths/assets as part of the RIS3 development process?

6. (ALL) Have the capacities of the HEIs (both educational/training offer and scientific and technological capabilities) been considered for the final selection of the RIS3 priorities and objectives?

7. (HEI/PRO) Did the HEI play a proactive involvement in participate in the identification of the appropriate indicators and the design of an effective monitoring system to measure progress?

8. (HEI/PRO) Who in the HEI/PRO was involved? Did individual academics contribute or was the process managed centrally? Which were the initial motives of the HEI/PRO involvement? In hindsight, what would you do in a different manner and why?

9. (ALL) What role did the HEI/PRO play in the leadership and governance of RIS3 in the region (e.g. membership of boards or other strategic groups)? Moreover,

a. Did the HEI/PRO contribute to the development of the shared place-based development vision?

b. Did the HEI/PRO contribute to the development of leadership capacity among other stakeholders?

c. Did the HEI/PRO collaborate with other stakeholders to develop region-specific 'university products' such as industrial PhDs; student internships; lifelong learning; and 'silver academy'?

10. (ALL) How visible has the HEI leadership been in spearheading and supporting the process to date? Did the HEI/PRO propose the introduction of novel or experimental policy instruments to support policy learning in the region? Has S3 governance structure facilitated the "collaboration spaces" to identify such experimental policy instruments?

Current contribution of HEIs to RIS3

11. (HEI/PRO) How closely do the selected RIS3 priorities map onto research and teaching strengths of the HEIs?

12. (HEI/PRO) Is the current HEI curricular offer aligned with the current regional economic demands? In which way the university is adapting the curricular offer to the future needs and expected socio-economic development of the region?

13. (HEI/PRO) How good is the HEI/PRO at attracting, training and retaining the skilled people that will create demand in the future through new business formation, student enterprise, graduate placements etc?

14. (ALL) Are there non-teaching or research activities (e.g., business support, knowledge exchange, cluster formation, networking opportunities) specifically targeted at firms in priority areas?

15. (HEI/PRO) Is the HEI/PRO involved in the monitoring and review of the regional RIS3? Acting on this information, did the HEI/PRO propose actions in the (re-)shaping and adaptation of the strategy itself?

16. (ALL) How are current S3 funding instruments supporting strengthen HEIs regional contribution (research, education, third mission)?

Future role in RIS3 – to be discussed in detail with the vice rector.

17. (HEI/PRO) Which are the main lessons learnt by the HEI/PRO's involvement and participation in the RIS3 during 2014-2020?

18. (HEI/PRO) In terms of research, are there any new or additional activities planned which will (further) strengthen the capacity of the HEI in the RIS3 priorities?

19. (HEI/PRO) In terms of teaching or lifelong learning, what new programmes or modules are planned in the priority areas? Will local businesses/clusters have any input in designing or shaping new programmes?

20. (HEI/PRO) What is the HEI/PRO's assessment of its competitiveness in attracting funding from all available sources? Does the HEI/PRO have an explicit strategy to increase research capacity/investment/funding applications in any of the priority areas?

Barriers and gaps

21. (ALL) What are the main barriers for the HEIs and other types of organisations to work together in the development of the RIS3?

22. (ALL) What are the main capabilities of the HEI that are not currently being fully mobilised and could help address the regional innovation resource/capability gaps?

Part III - Incentives to HEIs and university researchers to be involved RIS3 and regional development activities.

Awareness

23. (ALL) Are HEI/PRO communities at large aware of smart specialisation, and specifically aware of the RIS3? Should universities develop specific tools or informative campaigns to raise awareness of RIS3 in the university community?

Incentives, tools and programs

24. (ALL) What actions can be taken (on all sides) to better align activities (including priorities, incentives, timelines, etc.) in order to foster the necessary collaboration between HEIs and other regional actors?

25. (ALL) Can you bring examples of tools/mechanisms/good practices that have been implemented in other regions/countries and discuss the interest of implementing something similar in Eastern Macedonia and Thrace?

26. (ALL) Do you think that University-Business collaborations should form part of the toolkit of regional policy makers in their attempts to realize smart specialization strategies? What examples exist in that regard that you know of?

Part IV – Inter-regional cooperation

27. (ALL) Does your institution currently have well-established, structured, and long-standing collaborations within other Greek and or EU regions?

28. (ALL) Do these collaborations have had any impact in your role and contribution to the regional S3?

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