Interreg
Balkan-Mediterranean
INNOPLATFORM

EUROPEAN UNION

2018

Innovation Potential and Dominant Emerging Industries

Region of Central Macedonia, Greece

10/1/2018

Executive Summary

The report on the regional dominant emerging industries provides an analysis of the regional context of each PP region with a focus on the regional innovation potential and the dominant emerging industries.

The main objective of the current report is to analyse the dominant emerging industries in the Region of Central Macedonia, to present the regional context within those industries are growing and the positioning of the region compared to the whole country and the EU28. The regional context is analysed to major areas like the economy growth, the socioeconomic environment, the structure of the regional economy and the trade balance.

The regional innovation system is also described by presenting the major stakeholders, the human capital characteristics, the labour productivity and the investments for R&D in the region of Central Macedonia.

Since the Smart Specialization Strategy (RIS3) of Region of Central Macedonia is one of the official document that analyses the regional dominant emerging industries providing analyses of the strengths and weaknesses of the region but also the future opportunities that can reveal through the development of specific industrial areas, it is finally presented in the current report.

Acknowledgement

Table of Contents

Background

Region of Central Macedonia (RCM) is the largest region in Greece in terms of area size and its capital Thessaloniki, is the second largest city in Greece in terms of population. The region has a population of 1,875,000 inhabitants, representing 17 percent of the country's population and produces 17 percent of the GDP (second higher contribution after 37.7% of the region of Attica).

In administrative terms the Region of Central Macedonia is a public authority at the second degree of local government, operating at regional level. It is comprised of seven regional units (former "prefectures"): Imathia, Thessaloniki, Pella, Kilkis, Pieria, Serres and Chalkidiki. Its regional administration is structured at central and regional level. According to its structure all the relative Regional Units organizationally belong to the central administration which is seated in Thessaloniki.

Map of Central Macedonia Region

Region of Central Macedonia (RCM) according to the European Innovation Scoreboard (EIS) Regional Framework 2017, is considered as a Moderate Innovator, and its innovation performance has increased over time. The regional GDP per capital is significantly lower than the National and EU values, reaching the 76.2 % and 53.6 % respectively. The percentage of the people that employed in Agricultural and Mining Sector in RCM is slightly higher than the National and quite higher than the EU values (110% higher than Greece and almost 300% higher than EU28 average value). The Services sector concentrates the higher percent of the employees equal to the 62.2%, almost equal to the GR average (62.1 %) and EU28 (63.2 %).

In the next figure a comparison analysis of several factors of RCM in comparison with the whole country (GR) and EU28 values is presented:

The very low R&D expenditures in public but also in business sector, the absence of design application and the small number of trademark applications and EPO Patents, characterise the profile of the RCM and the efforts that should be given towards this direction. On the contrary, the RCM presents quite sufficient performance in the field of the collaboration of innovative SMEs and SME's that innovating in-house but also in marketing/organisational innovations.

Methodology

The core methodology used in developing the Regional studies for identification of the dominant emerging industries comes from the **EIS Regional 2017 Framework.**

The analysis is based on the use of secondary data coming from officially recognised institutions, predominantly from Eurostat, National statistical offices and other national and international institutions. More specifically, the databases of the **Hellenic Statistical Authority** (www.statistics.gr) and the **Eurostat** (www.eurostat.gr) have been used as the main reference sources for secondary data.

The official **Smart Specialization Strategy (RIS3 - Region of Central Macedonia)** has been also studied as a main source of reference for the identification of the dominant industry and the exploitation of data related with the region.

Regional Context

Economy and Growth of the Central Macedonia Region

- GDP growth rates (2001 – 2014)

GDP Growth Rates in Central Macedonia from 2001 to 2014 - Greece	
Year	**Percentage**
2001	16,8%
2002	11,0%
2003	19,1%
2004	21,8%
2005	2,0%
2006	26,6%
2007	24,0%
2008	13,5%
2009	-8,7%
2010	20,9%
2011	-22,6%
2012	-22,8%
2013	-16,3%
2014	-4,4%

Source: http://www.statistics.gr/

We observe a increase in the rate of the GDP in Central Macedonia from 2001 to 2007, with the highest rate of 26.6% in the 2006 financial year, but with the only exception of a downfall in the year 2005 at the percentage of 2% .By 2008 the GDP rate drops at 13.5%, but from 2009 however, the percentage of GDP has fallen significantly, reaching rates of the negative scale starting from 2009, till 2012, where the largest decrease is observed the last year 2012 and by -22.8%. From 2012 till 2014 the GDP started to increase year by year, but the rates are still in the negative scale.

- **Structure of the Economy**
  Describe the structure of the economy
  Composition of employment, %-shares
  - Agriculture & Mining (NACE A-B)
  - Manufacturing (NACE C)

Year	Agriculture	Mining and manufacturing	Total Employment	Percent Share - Agriculture	Percent Share - Manufacturing	Total Percent Shares
2000	127613	113429	721387	17,7%	15,7%	33,4%
2001	113783	116034	728507	15,6%	15,9%	31,5%
2002	106798	113244	728018	14,7%	15,6%	30,2%
2003	113768	112861	746895	15,2%	15,1%	30,3%
2004	97634	107982	749629	13,0%	14,4%	27,4%
2005	92308	111147	757429	12,2%	14,7%	26,9%
2006	89148	108828	783697	11,4%	13,9%	25,3%
2007	89515	111481	798259	11,2%	14,0%	25,2%
2008	92971	111982	802478	11,6%	14,0%	25,5%
2009	94086	98473	782859	12,0%	12,6%	24,6%
2010	90986	92101	763040	11,9%	12,1%	24,0%
2011	82885	83782	697233	11,9%	12,0%	23,9%
2012	82974	73661	647946	12,8%	11,4%	24,2%
2013	83218	70144	629364	13,2%	11,1%	24,4%
2014	87749	69510	635846	13,8%	10,9%	24,7%

Source: http://www.statistics.gr/

Observing the employment statistics of the sectors of agriculture, mining and industrialization we analyze the results:

1. In the agricultural sector, by 2000 till 2007, the proportion of people observed a falling order from 17.7% to11.2%, with a small increase meanwhile in 2003. By 2008 to 2009 an increasing order is observed by 0.8% in total. From this year to 2011 the GDP rate was kept steady in 11.9%, but by 2012 till 2014 the rate started increasing again from 11.9% which was in 2012, reaching it's peak at 2014 by 13.8%.

2. In the mining and manufacturing sector, from 2000 to 2003, the GDP rate was kept steady at 15% , by 2004 till 2008 the rate reduced by 1% with a small decrease in 2006 to 13.9%. From 2009 to 2014 the GDP rate is systematically reduced to 12.6% in 2009 and reached the lowest rate of 10.9% in 2014.

- Trade balance (exports and imports) and dominant industries in the export structure;

Due to the lack of regional data, the figures of Greece are presented at the table next:

Trade Balance in Greece	
Year	Percentage
2006	-42,87%
2007	-54,95%
2008	-66,20%
2009	-48,98%
2010	-38,96%
2011	-33,66%
2012	-27,89%
2013	-26,17%
2014	-28,17%
2015	-19,62%
2016	-20,46%

Socio-demographic environment

- *GDP per capita, PPS, (last year of its availability)*

GDP per capita, PPS	
Year	Percentage
2001	8,4%
2002	5,4%
2003	9,6%
2004	11,0%
2005	0,3%
2006	13,3%
2007	12,0%
2008	6,4%
2009	-5,2%
2010	-11,4%
2011	-11,8%
2012	-11,4%
2013	-7,9%
2014	-1,7%

Source: http://www.statistics.gr/

- *Population size by age, gender and education,*

INNOPLATFORM

Innovations Platform and Tools for increasing the innovation capacity of SMEs in the Balkan Mediterranean Area

Region / Gender & Age groups	Total	Doctorate Holders	Postgraduate Degree Holders	University Graduates	Tecnological Educational Institute Graduates	Graduates of Higher Vocational Schools	Graduates of Post-Secondary Education (IVT, college etc.)	Lyceum Graduates	Professional Lyseum Graduates	Graduates of Vocational Schools	Highschool Graduates	Graduate of Primary School	Non-graduate of Primary School, but knowledge of writing and reading	Completed Preschool Education	Don't know reading and writing	Non-classified Individuals	Percentage Share by Gender
Region of Central Macedonia	**1.882.108**	**7.677**	**22.856**	**183.440**	**79.180**	**10.504**	**84.986**	**353.163**	**73.682**	**49.618**	**204.347**	**451.471**	**88.471**	**118.477**	**33.113**	**121.123**	
0-9	188.745	0	0	0	0	0	0	0	0	0	0	0	27	67.500	95	121.123	
10-19	195.074	0	0	0	0	9	350	25.297	2.454	638	56.481	61.510	475	47.154	706	0	
20-29	227.678	252	4.648	31.058	22.370	1.360	22.923	81.679	22.714	7.352	17.895	12.121	1.184	215	1.907	0	
30-39	276.395	2.011	9.860	40.999	23.894	1.814	30.326	73.467	21.573	9.958	35.053	22.991	1.649	280	2.520	0	
40-49	277.419	1.941	4.786	46.423	18.736	2.069	14.768	77.282	15.043	10.614	40.114	41.363	1.690	288	2.302	0	
50-59	240.013	1.599	2.196	33.395	9.443	2.616	10.778	50.197	7.601	12.955	25.474	78.052	3.075	312	2.320	0	
60-69	195.720	1.219	939	18.412	3.113	1.602	3.835	25.050	2.780	5.309	14.443	105.424	10.028	530	3.036	0	
70-79	189.098	512	335	9.905	1.333	785	1.543	14.667	1.184	2.248	10.763	88.830	43.418	1.328	12.247	0	
80+	91.966	143	92	3.248	291	249	463	5.524	333	544	4.124	41.180	26.925	870	7.980	0	
Male	**912.693**	**5.019**	**11.549**	**84.193**	**36.248**	**6.680**	**36.218**	**166.400**	**48.136**	**36.273**	**106.736**	**209.866**	**32.453**	**60.182**	**10.873**	**61.867**	**48,5%**
0-9	96.512	0	0	0	0	0	0	0	0	0	0	0	11	34.584	50	61.867	
10-19	99.262	0	0	0	0	8	167	11.561	1.567	418	29.012	31.811	250	24.125	343	0	
20-29	113.232	156	1.925	10.545	9.770	876	10.272	41.052	14.060	4.811	10.818	7.227	623	127	970	0	
30-39	137.596	1.191	4.738	16.713	10.290	1.036	11.757	35.366	13.466	6.768	19.745	14.064	942	163	1.357	0	
40-49	136.816	1.197	2.545	20.252	8.405	1.280	5.820	36.556	10.163	7.947	20.052	20.371	883	165	1.180	0	
50-59	116.132	1.062	1.368	17.431	5.023	1.764	5.111	21.355	5.730	10.208	11.974	32.442	1.447	150	1.067	0	
60-69	91.964	862	648	10.556	1.797	1.058	2.037	11.191	2.081	4.171	7.437	45.218	3.627	203	1.078	0	
70-79	84.579	431	252	6.557	807	501	816	6.922	834	1.587	5.713	41.589	15.009	417	3.144	0	
80+	36.600	120	73	2.139	156	157	238	2.397	235	363	1.985	17.144	9.661	248	1.684	0	
Female	**969.415**	**2.658**	**11.307**	**99.247**	**42.932**	**3.824**	**48.768**	**186.763**	**25.546**	**13.345**	**97.611**	**241.605**	**56.018**	**58.295**	**22.240**	**59.256**	**51,5%**
0-9	92.233	0	0	0	0	0	0	0	0	0	0	0	16	32.916	45	59.256	
10-19	95.812	0	0	0	0	1	183	13.736	887	220	27.469	29.699	225	23.029	363	0	
20-29	114.446	96	2.723	20.513	12.600	484	12.651	40.627	8.654	2.541	7.077	4.894	561	88	937	0	
30-39	138.799	820	5.122	24.286	13.604	778	18.569	38.101	8.107	3.190	15.308	8.927	707	117	1.163	0	
40-49	140.603	744	2.241	26.171	10.331	789	8.948	40.726	4.880	2.667	20.062	20.992	807	123	1.122	0	
50-59	123.881	537	828	15.964	4.420	852	5.667	28.842	1.871	2.747	13.500	45.610	1.628	162	1.253	0	
60-69	103.756	357	291	7.856	1.316	544	1.798	13.859	699	1.138	7.006	60.206	6.401	327	1.958	0	
70-79	104.519	81	83	3.348	526	284	727	7.745	350	661	5.050	47.241	28.409	911	9.103	0	
80+	55.366	23	19	1.109	135	92	225	3.127	98	181	2.139	24.036	17.264	622	6.296	0	

Source: http://www.statistics.gr/

- *Population density,*

The **population density** in Central Macedonia is 30 residents / km^2.
Source: http://www.statistics.gr/

- *Degree of urbanisation (%).*

The Average age by **urban** and rural areas in Central Macedonia is 39.8 urban and 47.6 rural.
Source: http://www.statistics.gr/

- Active labour force by age, gender, educational background and employment status - from 2010 - till 2017;

Year	Population Total Number	Active Labour Force		
		Total Number	% Economily Active	% Ages 20-64
2016	1.600,0	819,5	51,2%	73,3%
2015	1.594,5	811,5	50,9%	72,7%
2014	1.599,3	790,5	49,4%	70,3%
2013	1.603,3	792,6	49,4%	70,1%
2012	1.609,3	799,8	49,7%	70,2%
2011	1.616,7	810,2	50,1%	70,0%
2010	1.622,9	828,0	51,0%	70,5%

Source: http://www.statistics.gr/

- Emigration trends if available – it is a challenge for the region, while the ones who leave the region are always the most educated ones.

Region / Gender and Age Groups	Total	Region of Eastern Macedonia and Thrace	Region of Central Macedonia	Region of Western Macedonia	Region of Epirus	Region of Thessaly	Region of Central Greece	Region of Ionian Islands	Region of Central Greece	Region of Peloponnese	Region of Attica	Region of the North Aegean	Region of the South Aegean	Region of Crete	Foreign Country	Percent - Foreign Country
Region of Central Macedonia	**1.863.708**	**4.491**	**1.829.520**	**2.497**	**959**	**2.604**	**793**	**467**	**641**	**496**	**4.641**	**976**	**1.002**	**993**	**13.628**	**0,73%**
1-14	265.715	368	262.515	148	44	188	62	41	40	39	409	133	131	111	1.486	**0,56%**
15-24	209.560	1.726	198.652	1.173	560	1.271	360	233	326	233	1.248	233	237	401	2.907	**1,39%**
25-34	254.944	1.188	246.266	523	213	570	186	115	168	123	1.472	385	367	265	3.103	**1,22%**
35-44	284.989	530	280.563	214	56	289	87	51	51	59	730	156	181	125	1.897	**0,67%**
45-54	258.111	217	255.788	130	28	105	40	9	24	19	309	37	52	35	1.318	**0,51%**
55-64	218.033	155	216.029	85	27	73	32	7	9	8	231	14	20	25	1.318	**0,60%**
65+	372.356	307	369.707	224	31	108	26	11	23	15	242	18	14	31	1.599	**0,43%**
Male	**903.347**	**2.220**	**885.518**	**1.275**	**448**	**1.293**	**427**	**243**	**342**	**275**	**2.652**	**537**	**502**	**487**	**7.128**	**0,79%**
1-14	135.854	184	134.200	71	18	90	28	19	23	14	207	67	62	66	805	**0,59%**
15-24	105.051	804	99.622	615	257	620	199	127	168	134	799	107	99	175	1.325	**1,26%**
25-34	126.897	644	122.243	293	105	293	107	61	97	68	814	227	195	127	1.623	**1,28%**
35-44	141.350	297	138.827	114	25	152	44	23	26	36	439	95	104	70	1.098	**0,78%**
45-54	125.983	108	124.699	57	13	59	19	3	14	11	170	24	27	23	756	**0,60%**
55-64	104.421	65	103.476	43	19	36	17	3	2	5	118	8	9	15	605	**0,58%**
65+	163.791	118	162.451	82	11	43	13	7	12	7	105	9	6	11	916	**0,56%**
Female	**960.361**	**2.271**	**944.002**	**1.222**	**511**	**1.311**	**366**	**224**	**299**	**221**	**1.989**	**439**	**500**	**506**	**6.500**	**0,68%**
1-14	129.861	184	128.315	77	26	98	34	22	17	25	202	66	69	45	681	**0,52%**
15-24	104.509	922	99.030	558	303	651	161	106	158	99	449	126	138	226	1.582	**1,51%**
25-34	128.047	544	124.023	230	108	277	79	54	71	55	658	158	172	138	1.480	**1,16%**
35-44	143.639	233	141.736	100	31	137	43	28	25	23	291	61	77	55	799	**0,56%**
45-54	132.128	109	131.089	73	15	46	21	6	10	8	139	13	25	12	562	**0,43%**
55-64	113.612	90	112.553	42	8	37	15	4	7	3	113	6	11	10	713	**0,63%**
65+	208.565	189	207.256	142	20	65	13	4	11	8	137	9	8	20	683	**0,33%**

Source: http://www.statistics.gr/

Structure of the Private sector

The innovative activities in the country will depend on the structure of its private sector and its R&D activities. FDIs presence should also be noted in the analysis due to their role in technology and knowledge transfer. The analysis should look into the following trends:

- Structure of the Private sector:
  - Composition of (total number and share (%))
    - Micro enterprises (0-9 employees);
    - SMEs (10-249 employees);
    - Large enterprises (250+ employees);
  - Share of foreign controlled enterprises (%)

Source: Eurostat. In the case Eurostat does not have data about the corresponding region please use the National Statistical Office or other National official sources of data.

Innovation Environment and Performance

Description of the Regional Innovation system

RCM has a critical mass of research centers, academic structures and centers of excellence. More specifically, it has three Universities (Aristotle of Thessaloniki, Macedonia, International), two Higher Technological Educational Institutions (Thessaloniki and Central Macedonia, former Serres), an important public research center (CERTH), a series of research structures of ELGO-DIMITRA and about 80 university and public research laboratories, research centers of excellence in the areas of bio - diagnosis, advanced production systems for petrochemical processes, energy and environmental technologies, information processing, virtual reality, transport safety, etc.

The research bodies like the Chemical Process Engineering, Informatics and Telematics Institutes,

Transport, Agrobiotechnology, Technology and Solid Fuels Applications the National Center for Research and Technological Development, the university research centers and laboratories, the National Institute of Metrology, the Institutes Forest Research and Grain and the Urban and Regional Research Unit Innovation URENIO are mainly public.

There are also intermediary institutions such as the Technology Park Thessaloniki, the Alexandria Innovation Zone of Thessaloniki, the Center Innovation Redistribution ACT, the Hellenic Technology Transfer Center, the European Business Innovation Center in Serres. Intermediaries operators are also part of the business incubators (Youth Incubator Enterprise i4G, Incubator THERMI SA, Technological Park Incubator, Technopolis, Thessaloniki). Offices can also be included Mediation - Interconnection of educational and research institutions, ie the Universities of Macedonia and Aristotle, Thessaloniki Technological Educational Institute and Thessaloniki & Serres and the National RTD Center.

The metropolitan complex of Thessaloniki is the main research center of region of Central Macedonia: over 90% of the scientific publications of the Region come from this area. This fact shows the dominant position of Central Macedonia's research potential in Northern Greece, which, through research collaborations, leverages the research efforts of the nearby

Greek Regions. Thus, Thessaloniki can be considered a major hyper-regional pole for research and development activities.

Human Capital and R&D activities in the region

According to the analysis of the Smart Specialization Strategy (RIS3) and Regional Operation Programe of Central Macedonia, regarding the position of Central Macedonia at national and European level in terms of key smart growth indicators the following facts are observed:

- The total R&D expenditure is 0.60% of the regional GDP, while private R&D expenditure is only 0.15%
- The interconnection and correlation of research with the productive profile of the RCM is incomplete despite the existence of a significant number of Researchers (4,565 full - time equivalent researchers).
- The number of scientific publications since 2008 is reduced due to staff cuts, reduction of researchers and research funding, and because of the "Brain drain" phenomenon.
- On the contrary, RCM is performing better than it the national and European average in human resources, i.e. university graduates and university graduates who potentially can support innovative actions.
- There is a concentration of a sufficient number of research teams in the AUTH and CERTH.
- There is specific regional expertise that is identified in publications in the fields of agriculture, geophysics, veterinary, breeding biology, science sports.

1. Available human resources
   - Population aged 30-34 with tertiary education

   The population of the region of Central Macedonia, aged between 30 and 34 with tertiary education is 11.048 which correspond s to 0,587% of the total region's population.

   Source: https://ec.europa.eu/commission/index_en

   - Lifelong learning

   The population of lifelong learning in the region of Central Macedonia is 3.049 which corresponds to 0,162% of the total region's population.

   Source: https://ec.europa.eu/commission/index_en

2. Attractive research systems
   - International scientific co-publications

Regional report on innovation potential and dominant emerging industries
Region of Central Macedonia, Greece
14 | P a g e

The international scientific co-publication for the region of Central Macedonia holds the indicator of 0,349%.

Source: https://ec.europa.eu/commission/index_en

- Top 10% most cited publications

The most cited publications constitute to the indicator of 0.580%.

Source: https://ec.europa.eu/commission/index_en

Source: Regional EU Innovation Scoreboard, or Eurostat. In case Eurostat does not have data about the corresponding region please use the National Statistical Office or other National official sources of data.

Regional investments in R&D
1. Finance and support
   - R&D expenditure in the public sector

R&D Expenditure in the public sector for Central Macedonia	
Year	**Expenditure in millions**
2001	14,18
2003	21,78
2005	26,00
2011	40,61
2013	52,88
2015	59,50

Source: http://metrics.ekt.gr/el/statistika-etak

The R&D expenditure in the public sector corresponds to the indicator of 0,504%.

Source: https://ec.europa.eu/commission/index_en

2. Firm investments
   - R&D expenditure in the business sector

R&D Expenditure in the business sector for Central Macedonia	
Year	**Expenditure in millions**
2003	43,00
2005	40,04
2007	31,64
2011	47,49
2013	30,18
2015	37,98

Source: http://metrics.ekt.gr/el/statistika-etak

The R&D expenditure in the business sector corresponds to the indicator of 0,108%.

Source: https://ec.europa.eu/commission/index_en

- Non-R&D innovation expenditures for SMEs only;

The non-R&D innovation expenditures, only for SMEs corresponds to the indicator of 0,401%.

Source: https://ec.europa.eu/commission/index_en

Regional Innovation activities

1. Innovators
   - SMEs with product or process innovations

The SMEs with product or process innovations corresponds to the indicator of 0,475%.

Source: https://ec.europa.eu/commission/index_en

- SMEs with marketing or organisational innovations

The SMEs with marketing or organisational innovations corresponds to the indicator of 0,503%.

Source: https://ec.europa.eu/commission/index_en

- SMEs innovating in-house

The SMEs innovating in-house corresponds to the indicator of 0,498%.

Source: https://ec.europa.eu/commission/index_en

2. Linkages
   - Innovative SMEs collaborating with others

The innovative SMEs collaborating with others corresponds to the indicator of 0,429%.

Source: https://ec.europa.eu/commission/index_en

- Public-private co-publications

The public-private co-publications corresponds to the indicator of 0,187%.

Source: https://ec.europa.eu/commission/index_en

3. Intellectual assets (if available – please request data from the available institutions)
   • EPO patent applications

The EPO patent applications corresponds to the indicator of 0,135%.

Source: https://ec.europa.eu/commission/index_en

• Trademark applications

The trademark applications correspond to the indicator of 0.031%.

Source: https://ec.europa.eu/commission/index_en

• Design applications

The design applications correspond to the indicator of 0.274%.

Source: https://ec.europa.eu/commission/index_en

Dominant Emerging Industries

Definition for a dominant emerging industry is an industry, or industry sectors which are absorbing the highest percentage of resources in the region mainly focused on employment and generating the largest exports.

The dominant emerging industries should be identified through the following indicators:

• Employment in MHT manufacturing/ knowledge-intensive activities

Number of employed persons in the medium-high and high tech manufacturing sectors include
Chemicals (NACE24), Machinery (NACE29), Office equipment (NACE30), Electrical equipment (NACE31), Telecommunications and related equipment (NACE32), Precision instruments (NACE33), Automobiles (NACE34) and Aerospace and other transport (NACE35).

Number of employed persons in the knowledge-intensive services sectors include Water transport (NACE 61), Air transport (NACE 62), Post and telecommunications (NACE64), Financial intermediation (NACE 65), Insurance and pension funding (NACE 66), Activities auxiliary to financial intermediation (NACE 67), Real estate activities (NACE 70), Renting of machinery and equipment (NACE 71), Computer and related activities (NACE72), Research and development (NACE73), and Other business activities (NACE 74).

- Exports of MHT manufacturing

Exports in Chemicals and chemical products (NACE Rev. 1.1 category 24), Machinery and equipment (NACE Rev. 1.1 category 29), Office machinery and computers (NACE Rev. 1.1 category 30), Electrical machinery and apparatus (NACE Rev. 1.1 category 31), Radio, television and communication equipment (NACE Rev. 1.1 category 32), Medical, precision and optical instruments (NACE Rev. 1.1 category 3), Motor vehicles, trailers and semi-trailers, and Other transport equipment (NACE Rev. 1.1 category 34).

- Number of registered companies in the NACE qualifications given in the appendix for the past three years – EU INOVA methodology
- Employment in the same industries for the past three years – EU INOVA methodology

NOTE Please consult with us if NACE level 4 data are not available for your region.

Suggested length (max 10 pages)

Strengths and Weaknesses

Strengths
- Strategically important geographic position of the RCM in SE Europe together with an established business positioning in this particular region.
- Strong manufacturing base with long tradition, sectoral concentration and considerable know-how. Particularly dynamic presence in the food and beverage, textiles and clothing and building materials sectors.
- Great concentration of tourist potential with variety in the forms of the offered tourism services and the existence of international strong tourist destinations.
- Strong interfaces with other areas of regional interest (agri-food, commerce - local production, health-wellness, sports, culture, religion-tradition, etc.)
- Remarkable transport and energy infrastructure and networks and transport networks of transnational importance
- Existence of a small but dynamic ecosystem of knowledge-intensive enterprises in the metropolitan complex of Thessaloniki with the existence of infrastructures for their housing (incubators, technology parks).
- A wide range of active scientific fields
- Existence of excellent research teams and research centers of the Region (e.g. AUTH and CERTH)
- Significant performance - in relation to the size of the Region - in European competitive research and technological development projects
- Operation of Thessaloniki as a supra-regional research node that leverages forces in the neighboring regions (Western Macedonia, Eastern Macedonia, Thessaly).
- Several new (post-2011) enterprises in the ICT industry. Many of them go beyond standard business process supporting new application domains.
- Thessaloniki (as a metropolitan complex) due to the evolution of demographic data is able to provide an ideal "open innovation" environment.

Weaknesses

- Unbalanced development of regional units and overconcentration of economic activity in Thessaloniki.
- Labor-intensive and medium / low-tech labour intensive economy.
- Low Competitiveness of the regional economy at European level in technological readiness and labor market indicators (based on the RCI Report).
- Low performance with European data on technology transfer.
- Lack of clear institutional research strategy and policies for interdisciplinary research and technology transfer.
- Limited number of research collaborations with world-class institutions.
- Lack of important players in the telecommunications sector.

Opportunities

- Positive trends in the development of the tourist flow towards Greece
- Constant demand for tourism products of specific forms of tourism
- Growth trends for exports to specific markets, especially in Southeastern Europe.
- Developing the eco-market of products, strengthened environmental regulations and enhancing environmental awareness.
- Increased mobility of young people in SE countries Europe for studies
- Stable funding of excellent research teams from the European financial instruments of the new programming period (Horizon 2020).
- Utilization of the new legislative framework for reforms in the organization and operation of academic institutions in critical areas such as research strategy, technology transfer and contribution to regional development.
- Regional Smart specialization strategy for the needs of the regional economy and neighboring countries / regions

Threats

- Poor economic environment, financial instability, weak demand and private consumption at national level.
- Negative environment for promoting entrepreneurship (legislation, bureaucracy, taxation, access to cheap finance).
- The macroeconomic environment endangers a significant proportion of government funding for research (new researchers, building infrastructure and equipment).
- Danger of significant human resources as a reaction to the region's consistently high unemployment in new ages.
- Competition from other European Regions with the same or similar features limits to a certain extent the diversification opportunities.
- Funding R&D actions requires safeguarding public funding and increasing private investment respectively (leverage mechanism for private investment).

- Competition from neighboring countries (Bulgaria, FYROM) to develop outsourced applications.

Conclusions and Recommendations

- The RCM is located in an indisputable privileged geographical position close to the Southeast Asian countries & Europe. This can create an advantage in the flow of products and services (tourism, logistics, education)
- Strong tourism potential enables the development of a range of diversified tourist products and the exploitation of the relevant international search stream for special forms of tourism. Also the interface with agri-food, commerce - local production, health-wellness, sports, culture, religion-tradition, etc. offers high prospects
- The strong (comparative) position in the agri-food sector with the existence of certain manufacturing sectors with tradition and concentration of critical mass, combined with the valuable research teams in the regional academic and research institutions, can create new or improve value chains that can make a significant contribution to the region's economic performance
- The strong processing base and critical mass in the textile and clothing sector offers a remarkable field of economic transformation based on the integration of new technologies and innovations in design, marketing, etc.
- The highly extrovert manufacturing activity in the building materials industry and the established position in SE Europe could be further exploited by turning to environmentally friendly and energy-efficient materials that also incorporate other functional features
- The growing emphasis of industrial and domestic consumers on energy saving and environmental performance, the further development of renewable energies infrastructures, the ability to finance energy-related companies and environmental upgrading, the development of the eco-market of products, etc. can be a field of action for the exploitation of the region's remarkable research potential.
- The ability to promote Thessaloniki as the transit hub of a combined transport and the growing demand for domestic goods can be enhanced by the use of horizontal transport, supply chain and IT technologies
- The offering of new innovative products and services can evolve into a stream of development for new knowledge-intensive companies.

The creation and maintenance of competitive advantages resulting from the above combinations require the "correction" of important weaknesses in the regional environment. The main ones are related to the lack of technology transfer to business sectors, the low demand for investment in modern ICT, the deployment of broadband infrastructures and the decentralization of productive forces from the city of Thessaloniki.

As a result of the SWOT analysis of the region of Central Macedonia and also from the conclusions of the policies of General Secretariat of Research and Development and the proposals of the National Strategic Development Plan for the next 10 years there are 4 **Champion Sectors** and 4 **Horizontal Support Sectors** that are identified.
The Champion Sectors are mainly involved in Gross Added Value of the Region, employ a significant number of employees, they have a critical mass and extroversion.

The Horizontal Support Sectors have a particularly decisive impact role in activating the advantages of the region's economy in innovation, competitiveness and extroversion and they act as catalysts for the innovation absorption.

Champion Sectors	Horizontal Support Sectors
Agro-food	Information and Communication Technologies
Materials	Energy Technologies
Textile & Clothing	Environmental Technologies
Tourism	Transportation & Logistics Technologies

References and Bibliography

[1] European Commission, *Regional Innovation Scoreboard 2017*

[2] Hellenic Statistical Authority, Employment by geographical area, region and industry, 2017

[3] Hellenic Statistical Authority, *Gross domestic product by region and county*

[4] Hellenic Statistical Authority, *Gross value added by industry (A10) - NACE REV.2,* 2017

[5] Region of Central Macedonia, *Smart Specialization Strategy for the Region of Central Macedonia,* 2014

[6] National Documentation Centre (EKT) of Greece "The regional dimension of knowledge-intensive activities in Greece - Overview 2015".

[7] Regional Operational Programme 'Central Macedonia 2014-2020'

[8] Eurostat (*http://ec.europa.eu/eurostat*)

Appendixes

- List of responsible regional institutions
- List of corresponding strategies, programs and other public measures for supporting the innovation environment in the region.
- Other
-

Regional Report on Innovation Potential and Dominant Emerging Industries