

RIS3 Regional Assessment: Dytiki Makedonia

A report to the European Commission, Directorate General for Regional Policy, Unit I3 - Greece & Cyprus

December 2012 (final version)

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1. Executive summary: Overall conclusions and recommendations

Smart specialisation priorities and the innovation system

Western Macedonia is endowed with rich natural resources such as energy and metallic minerals that have shaped its productive identity as one of the most important electric energy production centres in Greece (70% of country's total power is produced in the Region). However, the region is also home to cluster of firms in traditional sectors, including renowned regional products such as marble, saffron, fruits, local wines, furs and specialised arts and crafts. Western Macedonia is significantly specialised in Mining and agglomeration of lignite, Dressing and dyeing of fur; manufacture of articles of fur; Production and distribution of electricity; Mining and agglomeration of hard coal. However, the biggest regional employer is the crop production, market gardening and horticulture.

At the same time, Western Macedonia is one of Greek regions with lowest R&D intensity, notably in the business sector. Scientific specialisation is limited and focused essentially on energy technologies. From the economic side, the region has a very strong sectoral specialisation in energy and has implemented a number of targeted projects. Despite this focus, the region has not managed to create a competitive advantage and is trapped in a vicious circle where efforts towards differentiation and development in the energy sector have reinforced the dominance of the public sector.

The expert team **recommends** that:

- the RIS3 strategy should not focus exclusively on energy industry/technologies, while this is clearly a core regional specialisation, but needs to adopt a more diversified approach building on existing clusters of business activity and seeking to shift such 'niche' into higher-value added activities with a strong focus on export driven growth.
- the implementation of the RIS3 should be managed through a single agency that could be formed by reinforcing the role and capacities of ANKO to manage the delivery of both financial and non-financial (advisory services) support to regional firms. There is a need to carefully review proposed large investments in the university campus, the AOO or further energy related investments (further to the regional innovation pole initiative).

Summary and recommendations on governance

Western Macedonia has a good experience in participatory research and innovation programmes having realised the RIS (1996-1999) and RIS+ (2000-2002) projects, the Regional Programme of Innovative Actions "Knowledge-Clusters" (2003-2006), and the Regional Innovation Pole of W. Macedonia (2006-2009).

However, as was the case in other Greek regions, RTDI policy design and implementation over the years 2007-2013 was centralised, and was undertaken by the GSRT. The regional authority was not systematically informed about the projects implemented in the region (through the national OP) and the project did not take into account recommendations and priorities arising from previous initiatives. Most of these priorities still remain relevant for the region and form a foundation for the RIS3.

The expert team **recommends** that:

- RIS3 should involve wide participation of local stakeholders. Rules, roles and responsibilities of collaborative governance should be clearly defined at the beginning of the process. The RIS3 management structure should include decision-making, management, and technical support bodies.
- RIS3 should include a limited number of multi-sectoral initiatives covering selected zones of spatial specialisation. Prevailing models should target on the restructuring of the economy towards a more open and competitive model.

Summary and recommendations on innovation policy

The RIS3 of Western Macedonia is still at early stage. However, the orientations of the Regional Authority and stakeholders are towards a strategy that sets innovation and knowledge-based development priorities; it is outward looking and promotes critical mass potential (notably in the energy field).

The expert team **recommends** that:

- Policies for regional innovation should be based on the priorities defined by previous projects such as RIS, RIS+, K-Clusters, which still remain relevant. The strategy should include a long-term vision for the region with measures of diversification but also of technological modernisation of existing companies.
- Support to existing clusters should be the central element of the RIS3 of Western Macedonia. However, clustering should be organised from a bottom-up perspective, as emerging networks among companies.
- As the region does not have significant RDTI infrastructures, platform mechanisms could be considered as a solution for offering market and technology intelligence, incubation of new companies, export advice and support etc.
- Innovation actions and initiatives should be carefully selected with respect to criteria of (1) sustainability in the long run and mainly after the initial support period; (2) creation of capabilities and know how in the region; (3) offering integrated solutions to technology-production-market-funding; (4) leading to high leverage of private investments; (5) involving a large number of beneficiaries; and (6) contribution to development goals of competitiveness and employment.

Recommendations on clusters

Western Macedonia has both a number of statistically important clusters (leather products; farming & animal husbandry, energy, agricultural products, processed food, construction); as well as one . Furthermore, in the Region of West Macedonia there is one mature cluster – the Metal cluster (metalmalu) and a number of organic and emerging ones that could be further developed through appropriate policies mobilising the potential cluster actors. The Western Macedonia 2014-20 strategy suggest to deploy the Energopolis plan to implement integrated interventions in selected clusters and geographical areas. However, without significant experience on **cluster policies**, it is **recommended** to replicate a competitive technology industrial cluster approach to facilitate the rapid spread of good practice (e.g. Corallia Clusters Initiative, metalmalu). The region should also consider the creation of a regional **cluster secretariat** or support one at national level.

Recommendations on ICT policy – broadband – eservices

In addition to incorporating ICT as a core topic in the RIS3 strategy, the region should strengthen support on ICT for the most crucial sectors of the regional economy i.e. agriculture, mining, energy, tourism and health services. The region should investigate viable policy tools to provide incentives for new IT-enhanced products and services from local enterprises, and also award funds for the fast transformation of traditional businesses using ICT tools.

Broadband expansion (both wireline and wireless) is crucial for improving the competitiveness of the whole economy and improving the quality of life. Special attention should be given to keeping the talented ICT professionals and attracting new ICT businesses by creating new and viable demand for innovative ICT services. The coverage of citizens living in isolated areas is another important task of the Region that can be partly fulfilled by the deployment of reliable telemedicine and home-care services. An emphasis should be given to the conditions for a substantial role for the private sector in assuming part of the risk of the planned ICT investments.

2. Regional Innovation Performance and potential

2.1 Regional profile and specialisation

West Macedonia is a mountainous, landlocked, region, situated in north-west Greece. The region has the lowest population density with 2.6% of the population in 2010 (292,800 inhabitants)¹ on 7.2% of the Greek land area. Although generating only 2.5% of the national GDP, with a GDP/capita of €20,300 in 2009 representing 86% of the EU27 average, the region ranks 4th among the Greek regions in terms of wealth creation per inhabitant. Even if education levels have improved since 2000, from 12.3% of the population aged 25-64 with tertiary education attainment to 19.3% in 2011, they remains well below the national (25.4%) and EU27 (26.8%) averages. Moreover, only 2.2% of adults aged 25-64 participated in life long learning in 2009 (Greece 3.3%, 9.3% EU27). Infrastructure investments have greatly improved (Egnatia road, etc.) the road network and improved accessibility, although the rail network is considered as insufficient and the two regional airports have low passenger volumes. Moreover, even if the telecommunication network has been improved over the last decade, the region still lags behind in the digital economy (see section 4.3).

The region has been hard hit by the economic crisis with unemployment rising from 12.1% in 2007 to 23.2% in 2011. The crisis accentuated existing problems since the region already had the highest unemployment rate amongst Greek regions due to de-industrialisation and the migration of labour intensive industries to neighbouring low labour cost countries. Since 2008, it is estimated that over 20% of regional firms have ceased operations, whilst due to pay cuts and increased taxation the turnover of regional firms, particularly in the trade sector, has dropped by 40% (RIM, 2012).

Western Macedonia is endowed with rich natural resources such as energy and metallic minerals that have shaped its productive identity as one of the most important electric energy production centres in Greece (70% of country's total power is produced in the Region). The tertiary sector accounted for 45.4% of the regional added value in 2009, and the industry & construction sector 50%. In the services sector, retail and wholesale trade, tourism and public administration services are the most important in terms of value added, while the health and financial sectors are gradually growing in importance. The manufacturing base is in traditional sectors, including renowned regional products such as marble, saffron, fruits, local wines, furs and specialised arts and crafts. The share of the primary sector has declined to only 4.6% of the regional added value in 2009 (compared to 7.4% in 2000). Western Macedonia is significantly specialised² in Mining and agglomeration of lignite, Dressing and dyeing of fur; manufacture of articles of fur; Production and distribution of electricity; Mining and agglomeration of hard coal. Although the biggest regional employer is the growing of crops, market gardening and horticulture, it ranks only 12th in Europe when considering the relative specialisation rates (see also Appendix F).

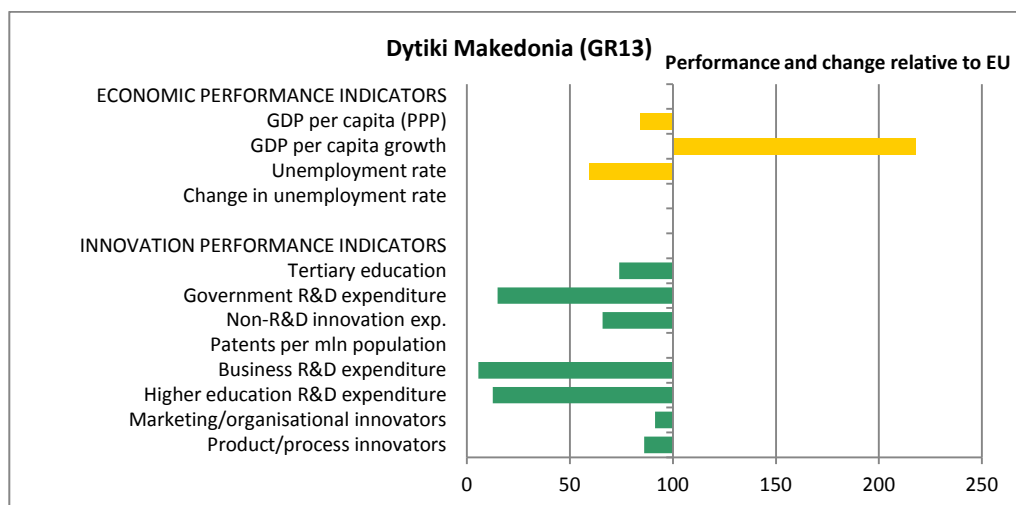
Western Macedonia is one of the least innovative of Greek regions, investing only €5m on R&D (0.4% of the national total), or 0.1% of regional GDP (Greek average is 0.6%, EU27 1.83%) in 2005. Most strikingly, regional businesses invested only €183k in R&D, i.e. 3.7% of the total GERD (versus 31% nationally and 63% in the EU27). Due to the crisis, private investment in R&D will most probably have fallen further. As a result, the majority of the regional R&D expenditure occurs in the higher education sector (€3m, i.e. 59.2% of GERD compared to an average of 47.5% in Greece and

¹ All data provided is sourced from Eurostat unless stated differently.

² The minimum degree of specialisation is 1.5 (meaning that the region has 50% more employment in the industry than the size of the region), and the industry must have at least 500 employees in the region (in order to eliminate high specialisations in very narrow industries).

22.5% in EU27) and in the government sector, which accounts for 40% (€2m) of the regional GERD (20.3% in Greece, 13.6% in EU27).

Figure 1 Benchmark of regional innovation performance – Western Macedonia



Source: Regional Innovation Monitor, data used is 2011 or latest available year. Trend data is over latest three year period for which data is available.

Human Resources for Science and Technology (HRST) have increased steadily since 2000, in line with the reinforcement of the regional research capacities. In 2011, HRST accounted for 25% of the regional workforce (active population)³ which represented 1.9% of the HRST in Greece. In 2005, there were 154 full-time equivalent (FTE) R&D personnel, or 0.13% of the regional active population (0.69% Greece, 0.95% EU27). Not surprisingly, most worked in higher education (109 FTE) and in the government sector (27 FTE) and only two were in a business. The number of researchers was even lower (0.08% of the active population, 0.4% Greece, 0.59% EU27) and 81 of the 98 regional researchers worked in higher education and only one in a company.

The University of Western Macedonia (UOWM), created in 2003, and the Technological Education Institute Western Macedonia (TEIDM) are the main regional research performers. Looking at their scientific production, between 2006 and 2010, based on Thomson Reuters data⁴, the UOWM produced 183 publications (0.5% of total Greek academic publications), 56% involving national co-authorship and 47% international collaboration. Publications of the UOWM were cited 355 times over the period, giving the UOWM an overall citation impact of 0.9. The main fields of scientific activity of the UOWM are natural sciences (125 publications from 2006-10, 279 citations, citation score 0.72) and engineering and technology (111 publications, 284 citations, citation score 1.01). The TEIDM has a reasonable level of scientific output, with 131 publications from 2006-10 ranking it 5th out of the 16 Greek TEI) and 489 citations (4th). The citation impact of the TEI West Macedonia is relatively high at 0.95 and researchers are particularly active in natural sciences (103 publications 2006-10, 444 citations, citation score 0.94) and engineering and technology (58 publications, 239 citations, citation score 0.99). 81% of publications involved a national collaboration and 12% an international collaboration.

In terms of scientific specialisation, according to the RIM report (2012), the bulk of RTDI efforts of the research organisations in the region are concentrated mainly in

³ This indicator gives the percentage of the total labour force in the age group 15-74, that is classified as HRST, i.e. having either successfully completed an education at the third level or is employed in an occupation where such an education is normally required.

⁴ <http://metrics.ekt.gr/en/report02/index>

energy related issues such as energy production, clean energy technologies, hydrogen and alternative energy sources⁵, energy saving and related environmentally friendly technologies. This clearly is in line with a main player in the regional economy, the public power company, and with the push to develop renewable energy but nevertheless suggest other key clusters may not be so well served.

Figure 2 : SWOT of regional innovation potential and specialisation

Strengths	Weaknesses
<ul style="list-style-type: none"> • Natural endowments • Level of education of the population rapidly growing • Presence (even if recent) of regional academic research capacities • Key player in the energy production sector 	<ul style="list-style-type: none"> • Quasi inexistent R&D investments by businesses • Very low level of overall R&D investment • Traditional structure of the economy • Low level of ICT diffusion and use • Low level of life-long learning practices • No data on patenting activities • Low level of science-business collaboration • Lack of innovation culture within firms
Opportunities	Threats
<ul style="list-style-type: none"> • Better incentives for business investments in R&D activities • Increased coordination of national and regional policies to support ICT diffusion • Smart specialisation in the energy area • Improved support to upgrading of SMEs technological capacity • Attraction of foreign direct investments 	<ul style="list-style-type: none"> • Economic specialisation in low-tech sectors (agriculture, tourism) • Pollution and environmental damages associated to mining activities and energy production • Brain drain

To sum up, the regional economy faces significant challenges related to the need for restructuring of the economy towards higher value added activities, the absence of foreign direct investment, the declining manufacturing sector and the pollution and degradation of the natural environment resulting from decades of mining and energy production activities. The recent economic crisis along with discontinuities in regional research and innovation policies have magnified the structural deficiencies of the local economy, characterised by small companies, traditional industries, high unemployment, and low competitiveness.

Scientific specialisation is limited and focused essentially on energy technologies. From the economic side, the region has a very strong sectoral specialisation in energy and has implemented a number of targeted projects (see section 3.1). Despite this focus, the region has not managed to create a competitive advantage and is trapped in a vicious circle where efforts towards differentiation and development in the energy sector have reinforced the dominance of the public sector.

The expert team **recommends** that the RIS3 strategy should not focus exclusively on energy industry/technologies, while this is clearly a core regional specialisation, but needs to adopt a more diversified approach building on existing clusters of business activity and seeking to shift such ‘niche’ into higher-value added activities with a strong focus on export driven growth.

⁵ See for instance, the plans developed under the BioClus project for the exploitation of biomass resources in Western Macedonia.

2.2 The strengths and weaknesses of the regional innovation system

The European Regional Innovation Scoreboard⁶ ranks West Macedonia (grouped in the mega-region Voreia Ellada) as a modest-high innovator (the lowest of four performance categories) along with all other Greek regions aside from Attica. Similarly, the 2011 Regional Innovation Monitor (RIM) annual report classified the region amongst a group of knowledge absorbing innovating regions (again along with all other Greek regions except Attica). From a positive perspective, this group of 19 EU27 regions has the highest average score (amongst the RIM regional grouping) on ‘innovative entrepreneurship’ (based on the share of SMEs that declare to have introduced innovations in the Community Innovation Survey) but the lowest score on ‘technological innovation’: business R&D and patenting is very low, while the non-R&D innovation expenditures (as a % of turnover) are higher than in any other group. This implies, as would be expected, that innovation is mostly through integrating knowledge created elsewhere by purchasing ‘off-the-shelf’ technologies.

In this context, the Western Macedonia regional innovation system (see Appendix C) can be considered one of the weakest in Greece in terms of ‘institutional thickness’. Aside from the two higher education institutes, there only are a couple of other specialised research institutes, notably the Institute of Solid Fuel Technologies & Applications (ISFTA)⁷. The main intermediary is ANKO⁸, which is a part of the Enterprise Europe Network, and was created by the local authorities, the State, the agricultural cooperatives and Chambers of Commerce, in order to act as a ‘pioneering’ organisation for regional development.

Recent efforts, such as the establishment of the University, the strengthening of ISFTA and the implementation of the Regional Innovation Pole of Western Greece aim at reversing the image of the region as a modest R&D performer. Moreover the region is pursuing a policy to boost its profile as the most important energy production region of Greece, by simultaneously turning towards ‘greener’ solutions. Such measures to strengthen the regional research community were notably pursued through the regional innovation pole SYNENERGIA that focused on energy technologies. Stakeholders were divided as to whether the pole had succeeded in its aims.

In terms of research infrastructure, the planned Astronomy Observatory of Orliakas (AOO) with a budget of €2.5-3m, featuring a state-of-the-art telescope, is expected to differentiate further the regional research profile. The area is one of the last remaining in Europe free from light pollution. AOO will contribute to European research programmes and the observatory will host visiting researchers. There are also plans to further develop the University campus of Western Macedonia.

The expert team **recommends** that the implementation of regional level research and innovation measures should be managed through a single agency that could be formed by reinforcing the role and capacities of ANKO to manage the delivery of both financial and non-financial (advisory services) support to regional firms. There is a need to carefully review proposed large investments in the university campus, the AOO or further energy related investments (further to the regional innovation pole initiative). Remaining ERDF technical assistance funds should be used to commission one or more evaluations and/or feasibility studies to provide evidence for the RIS3.

⁶ MERIT & Technopolis 2012, http://ec.europa.eu/enterprise/policies/innovation/files/ris-2012_en.pdf

⁷ <http://www.lignite.gr/en/index.htm>

⁸ <http://www.anko.gr/>

3. Stakeholder involvement and governance of research and innovation policies

3.1 Stakeholder involvement in strategy design and implementation

Western Macedonia has a good experience in participatory research and innovation programmes having realised the RIS (1996-1999) and RIS+ (2000-2002) projects, the Regional Programme of Innovative Actions “Knowledge-Clusters” (2003-2006), and the Regional Innovation Pole of W. Macedonia (2006-2009).

Figure 3 Priorities of RIS, RIS+ and the Regional Innovation Pole

	Objectives and actions
RIS (1996-1999)	<ul style="list-style-type: none"> • Increase the endogenous capacity for R&D • Support of technology transfer activities and of business access to external sources of technology • Promotion of financing mechanisms, available to enterprises for technology and innovation • Support of technological cooperation among enterprises • Organising a regional system for technological information • Improvement of technical skills of human resources
RIS+ (2000-2002)	<p>Horizontal and sectoral actions related to RTDI</p> <ul style="list-style-type: none"> • Operation of a Regional Innovation Office • Pilot operation of Technology Foresight • Knowledge clusters in Western Macedonia • Industrial ICT for business purposes • Business plan for the ISFTA institute <p>Other activities</p> <ul style="list-style-type: none"> • Development of a permanent Regional Unit for Innovation • Establishment of an Association of Industries of Western Macedonia • Networking with RIS and RIS+ EU regions • Creation of a pool of Innovative Ideas
Regional Innovation Pole of Western Macedonia (2006-2009)	<p>General Objectives</p> <ul style="list-style-type: none"> • Increase the technological and innovation performance of the Region • Creation of a favorable innovation environment and innovation culture • Increase the competitiveness of regional economy <p>Actions</p> <ul style="list-style-type: none"> • Innovation consortia in the Energy sector • Spin-offs on clean energy business • Technological platform of the innovation pole • Development of identity for the RIP-WM (Dissemination) • Technology Foresight in the wider field of energy • Technology clinics and benchmarking SMEs • Technology audits for energy consumption in SMEs • Establishment of a Center for monitoring the developments in the field of energy in the Region of Western Macedonia

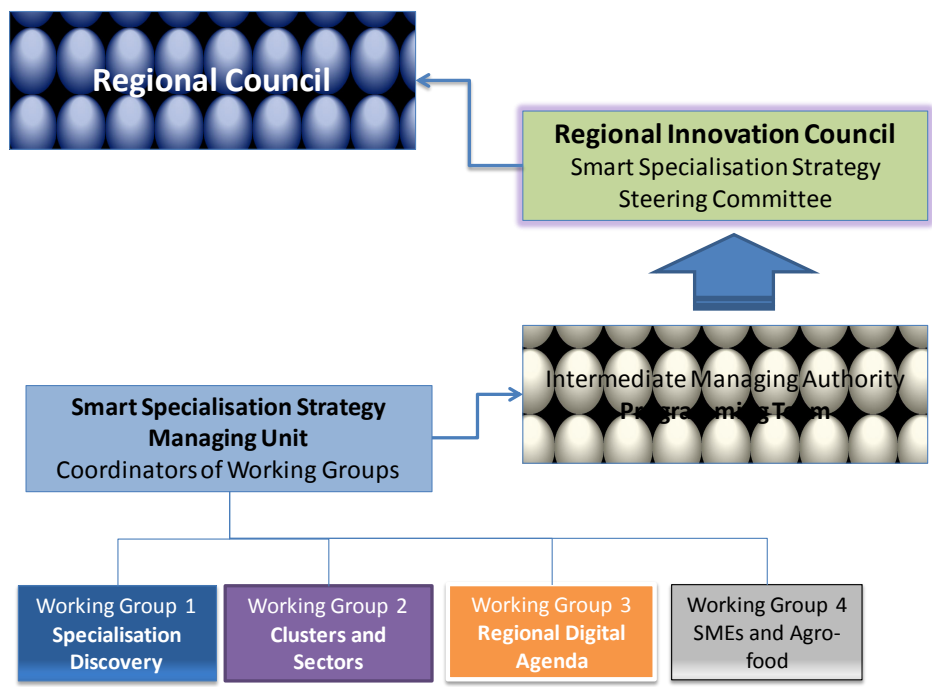
As in the case of the other Greek regions, RTDI policy design and implementation over the years 2007-2013 was centralised, and was undertaken by the GSRT. The regional authority was not systematically informed about the projects implemented in the region (through the national OP) and the project did not take into account recommendations and priorities arising from previous initiatives. Most of these priorities still remain relevant for the region and form a useful foundation for the RIS3.

Western Macedonia has a limited, but significant, number of stakeholders that have been successively engaged in the previous regional innovation initiatives. These include the ANKO, the UOWM, the TEIWM, the ISFTA, business clusters and

business associations. However, the region is characterised by various nucleus of significant spatial specialisation, such as marble in Kozani, fur in Kastoria, Saffron in Krokos and Velventos, representatives of these associations/unions should also be invited to participate in the design of the RIS3.

For the 2014-20 programming period the Regional Authority has strong will in collaborating with the local stakeholders in order to define clear strategic objectives. During the meeting organised by the IMA on 3rd October, regional stakeholders stressed the need for an integrated, targeted and regional based R&I policy. Some participants expressed their impression that efforts of the past have not brought satisfactory results, mainly because of the limited funds that were made available. Therefore, measuring the impact of policies under implementation is considered imperative. Monitoring and evaluation of the new strategy should also be incorporated throughout the 2014-2020 funding period.

The expert team **recommends** that the RIS3 should involve a wide participation of local stakeholders and representatives of various clusters that exist in the area. Rules, roles and responsibilities of collaborative governance should be clearly defined at the beginning of the process as a matter of urgency. It is proposed that the region should adopt the following planning structure:



3.2 Multi-level governance and synergies between policies and funds

In general, the OP 2007-2013 is aligned with the priorities at a national and European level. However, during the meeting with the stakeholders, a number of policies were mentioned of a rather conflicting character, which undermined previous development efforts for the development of the region.

Recommendations

- RIS3 should include a limited number of multi-sectoral initiatives also covering selected zones of spatial specialisation. Prevailing models should target on the restructuring of the economy towards a more competitive model.
- RIS3 funding should cover all funds available in the region from the regional and national OPs.

- Successful examples in the area (e.g. the organisation of the Association of Saffron producers, the revival of old agricultural species in Voios etc.) should be diffused and the knowledge acquired should be transferred to other areas.

3.3 Vision for the Region

The vision for Western Macedonia in the 2007-2013 ROP is: “creation of a competitive economy with conditions for sustainable development, strengthening the role of the Region in the broader geographical area”. This vision is translated into an Integrated Regional Development Pact, based on the triple goal “Entrepreneurship – Environment – Human Resources”. The five main objectives contributing to this goal are 1) the creation of conditions for differentiating the rather connected to energy production base and adaptation to the international standards, 2) enforcement of the role of urban centres and promotion of social cohesion and development of an operational communication network with the rural and mountainous areas of the region, 3) improvement of the attractiveness of the manmade environment and the quality of the natural environment 4) enforcement of the spatial organisation and the outward orientation of the Region towards the Balkan countries through accessibility and multi-thematic cooperation and 5) improvement of provided services towards citizens with the use of ICT (OP Macedonia - Thrace 2007-2013, pp. 108, 11-114).

The initial strategy proposal of the region (Region of Western Macedonia, 2012) aims to create a stable regional planning mechanism (Regional Plan RTDI), coordination, information, promotion, activation of the research and business area and measuring the results of RTDI actions and entrepreneurship. However, while aiming to reinforce structure for research and innovation and promote the adoption of innovation in ‘all sectors’, the draft plan places again an “emphasis on energy including an Integrated Development Programme for lignite”.

Recommendations

- In the 2014-20 period the region should adopt a holistic strategy towards a new long-term sustainable development vision, given the environmental degradation. So far, initiatives undertaken were of a circumstantial character and lacked a long term perspective. The vision for the new strategy should be towards the post-mining era and should include mechanisms that will help the region reduce the over-dependence on the operations of the Public Power Corporation S.A.

4. Towards a smart specialisation strategy

4.1 Regional research and innovation policies

The current OP 2007-2013 of Western Macedonia includes three priority axes, plus technical assistance, with following breakdown of funds:

Figure 4 : Priorities and funding of the ROP Western Macedonia 2007-2013

Priority axis	Total funding EU + national	%
1. Accessibility to Infrastructures and services	92.536.000	16,5%
2. Digital convergence and entrepreneurship	123.560.000	22,03%
3. Sustainable development and quality of life	299.504.000	53,4%
4. Technical assistance	45.260.000	8,06%
TOTAL	560.860.000	100

The Digital convergence and entrepreneurship priority received about one fourth of the total OP funding allocated to the region, of which, the majority was for actions boosting ICT usage and a more limited number of actions related to R&I.

Figure 5 : Current regional research, innovation and ICT priorities

Policy Documents	Priorities and objectives
<p>Operational Programme of Western Macedonia 2007-2013, Athens 2007.</p> <p>Επιχειρησιακό Πρόγραμμα Δυτικής Μακεδονίας 2007-2013, Αθήνα 2007</p> <p>Priority 5: Digital Convergence and Entrepreneurship</p>	<p>General objectives of this priority are 1) the creation of conditions for the differentiation of the rather dependent on the energy sector production base, and adaptation of local standards and 2) the improvement of existing services to citizens with a parallel exploitation of ICT.</p> <p>This is expressed by two action lines:</p> <ul style="list-style-type: none"> • Improvement of productivity of the region through the use of ICT via (a) the promotion of the use of ICT in enterprises of the region, (b) the provision of e-services to enterprises and re-design of local governance procedures, (c) the enforcement of the ICT sector in the regional economy and (d) the promotion of local entrepreneurship in ICT intensive sectors • Improvement of the quality of services, through the a) improvement of daily life through the use of ICT – equal participation of all citizens to Digital Greece and b) the development of local e-government services for citizens <p>Specific goals:</p> <ul style="list-style-type: none"> • Differentiation and enrichment of the productive base through the adoption of innovation and the improvement of competitiveness of firms. • Development of research and technology at an entrepreneurial level with the cooperation of educational and entrepreneurial stakeholders and the introduction of new production methods • Increase of the added value of the energy sector by improving its connection to the local productive system • Enforcement of entrepreneurship support structures and of infrastructures for attracting businesses • Development of ICT applications in the public sector and local governance • Development of ICT structures and infrastructures with access from all citizens.

According to data received from the GSRT (see Appendix D), 27 projects have been funded in Western Macedonia by the OP Competitiveness amounting to a total budget of €1.88m (or €69.6k on average per project), or 1.52% of the total national budget (€236m). Just under three-quarter of the funding has been allocated to companies (€1.36m) and the remainder to research organisations (€525k). In terms of the thematic breakdown, 53% of funding was allocated to Engineering and Technology projects (the fourth highest share for this field out of the 13 Greek regions), 22.8% to agricultural sciences and 18.5% to exact sciences. An alternative categorisation used by the GSRT suggests that the engineering and technology projects are mainly concentrated in the energy (33% of total budgets) and in favour of High value added products and technologies with an emphasis on traditional industries (23%). Agriculture, Fisheries, Farming, Food and Biotechnology accounted for 31% of the total regional RTDI projects. The strong focus on energy is consistent with the regional specialisation. However, there is a need to examine further the projects in other fields to analyse to what extent they supported the other key regional clusters.

During the meeting in October 2012, stakeholders suggested a number of regional for 2014-2020 for research, innovation, digital convergence and SME support, including

- Creation of sustainable research infrastructures
- Targeted actions supporting entrepreneurship and business clusters
- Collaboration of research and production organizations
- Creation of a pool of innovation ideas – Transfer of solutions from other regions
- Ongoing measurement of innovation policy impact and Ongoing measurement of innovation policy impact and adjustment
- Mapping of investment and resources in networks and applications
- Opening of networks to private investors

- Use of local funds for innovation
- Use of modern marketing practices to promote local products and clusters

The RIS3 of Western Macedonia is still at early stage. However, the orientations of the Regional Authority and stakeholders are towards a strategy that sets innovation and knowledge-based development priorities; it is outward looking and promotes critical mass potential (notably in the energy field).

Recommendations

- Policies for regional innovation should be based on the priorities defined by previous projects such as RIS, RIS+, K-Clusters, which still remain relevant. The strategy should include a long-term vision for the region with measures of diversification but also of technological modernisation of existing companies.
- Support to existing clusters should be the central element of the RIS3 of Western Macedonia. However, clustering should be organised from a bottom-up perspective, as emerging networks among companies.
- As the region does not have significant RDTI infrastructures, platform mechanisms could be considered as a solution for offering market and technology intelligence, incubation of new companies, export advice and support etc.
- Innovation actions and initiatives should be carefully selected with respect to criteria of (1) sustainability in the long run and mainly after the initial support period; (2) creation of capabilities and know how in the region; (3) offering integrated solutions to technology-production-market-funding; (4) leading to high leverage of private investments; (5) involving a large number of beneficiaries; and (6) contribution to development goals of competitiveness and employment.

4.2 Cluster and entrepreneurship policies

Using the European Cluster Observatory rating system, the sectors in West Macedonia with the highest combined scores for size⁹, specialisation¹⁰ and focus¹¹ are: leather products with 3 stars; farming & animal husbandry with 2 stars and oil & gas, agricultural products, processed food, construction with 1 star. Furthermore, in the Region of West Macedonia there is one mature cluster (see Box 1) and a number of organic and emerging ones that could be further developed through appropriate policies mobilising the potential cluster actors (see Appendix C).

⁹ The 'size' measure shows whether a cluster is in the top 10% of all clusters in Europe within the same cluster category in terms of the number of employees. If employment reaches a sufficient share of total European employment, it is more likely that meaningful economic effects of clusters will be present. Those in the top 10% receive one star.

¹⁰ The 'specialisation' measure compares the proportion of employment in a cluster category in a region over the total employment in the same region, to the proportion of total European employment in that cluster category over total European employment. If a region is more specialised in a specific cluster category than the overall economy across all regions, this is likely to be an indication that the economic effects of the regional cluster have been strong enough to attract related economic activity from other regions to this location, and that spill-overs and linkages will be stronger. If a cluster category in a region has a specialisation quotient of 2 or more it receives a star. If a cluster category in a region has a specialisation quotient of 2 or more it receives a star.

¹¹ The 'focus' measure shows the extent to which the regional economy is focused upon the industries comprising the cluster category. This measure relates employment in the cluster to total employment in the region. If a cluster accounts for a larger share of a region's overall employment, it is more likely that spill-over effects and linkages will actually occur instead of being drowned in the economic interaction of other parts of the regional economy. The top 10% of clusters which account for the largest proportion of their region's total employment receive a star.

Box 1: Mature and Emerging Clusters in West Macedonia

Mature Clusters:

Metal cluster (metalmalu)¹². The following entity in the Region is also member of the microelectronics-based systems and applications cluster (mi-Cluster)¹³: the Kastoria Department of the Technological Educational Institute of West Macedonia.

Emerging Clusters:

Leather Products (dressing and dyeing of fur; manufacture of articles of fur), *Energy* (mining and agglomeration of lignite, production and distribution of electricity, remote heating, renewable energy sources), *Farming & Animal Husbandry* (farming of animals, especially beef and sheep meat), *Agricultural Products* (growing of crops; market gardening; horticulture, organic products, especially saffron, herbs, fruits, energy plants), *Processed Food* (manufacture of food products, especially dairy products, honey, wine and tsipouro), *Construction and Construction Materials* (site preparation, manufacture of articles of concrete, plaster and cement, wood, marble), *Tourism and Hospitality* (eco-tourism, specialized arts & crafts).

In the Region of West Macedonia and during the current programming period (2007-2013) numerous actions have been implemented related to research, innovation and entrepreneurship. However, the innovation actions did not manage to assimilate the results into the production process and add significant value in businesses; the key features of the production system of the Region still depend on conventional industries (energy, fur), the limited range of sectoral specialization (metal, wood), the very small size of companies, the inability to identify and cover with the necessary infrastructure the business needs, the lack of investment in RTDI, the absence of and interface between RTDI actors and business activity and low competitiveness.

In both October 2012 meeting, and in the WM14-20 strategy, the region stated their willingness to deploy the Energopolis plan to implement integrated interventions in selected clusters and geographical areas. However, without significant experience on **cluster policies**, it is **recommended** to replicate a competitive technology industrial cluster approach to facilitate the rapid spread of good practice (e.g. Corallia Clusters Initiative, metalmalu). The region should also consider the creation of a regional **cluster secretariat** or support one at national level.

Furthermore, more qualitative focus studies should be carried out in the activity domains where the region shows relative specialisation to identify niches. This involves expert work on **value chain analysis**. It also involves an analysis of the linkages between clusters/industries/sectors, in order to examine whether one can talk about related variety across the areas of regional specialisation.

An emphasis should be given to facilitating **cross-clustering** and the identification of innovation opportunities at the interface between different clusters (e.g. incorporate ICT in priority sectors to increase competitiveness). Specific funding measures and support should be developed aimed at primary and secondary sector innovation and inter-linkages with other key sectors in the region.

A particular focus should be given to strengthening the cooperation of existing/emerging sectors/clusters to make **connections to local, national and global value chains**. In this respect and due to the fact that the Region has borders and strong relations with other Greek regions, as well as neighbouring countries Albania and FYRoM, it is recommended as also referred in the WM14-20 the development of transnational and transregional clusters in the areas of transport, energy and telecommunications infrastructure, management of common natural

¹² www.metalmalu.gr

¹³ www.mi-Cluster.gr

resources and development of common topics of interest (entrepreneurship, rural development, tourism, culture, health, education).

As discussed above, only a few actions were implemented in the areas of technology transfer and improvement of cooperation networks between small businesses (SMEs), assistance for research and technological development, in particular for SMEs and support services for firms and groups of firms. Entrepreneurial and innovation support services (like one-stop-shops) have been promoted by various organisations, notably through Structural Fund projects. However, despite the efforts of such intermediaries, collaboration between innovation actors remains limited. The regional innovation pole programme was discontinued even though it produced some noteworthy results/deliverables (e.g. the biofuels report). As noted in section 2.2, it is **recommended** to create a **one-stop-shop** within existing structures or a new structure for potential investors/SME start-ups with the appropriate improvements and sustainability plans based on lessons learnt and known deficiencies of current implementations.

As exhibited in Appendix C the Region of West Macedonia has only one operational industrial zone and two others at planning stage while no incubator has been established so far. The zone offers mainly real estate services and is not sector-specific. The zone is not referred in the WM14-20 strategy as an opportunity for the Region. It is **recommended** to further develop the **zones and parks** by offering added-value services to tenants and provide incentives for the establishment of **incubators** in combination with other policies like clusters.

Furthermore, neither regional business angel networks nor regional venture capital funds have been formed in the Region, but they are rightly referred in the WM14-20 strategy as an opportunity to improve the entrepreneurial environment. A regional cooperative bank operates, but its impact cannot be assessed. It is **recommended** to support the creation of **business angel networks**, meeting professional standards, and co-investment funds. The fund can be initiated by the Regional Development Fund (Τοπικός Πόρος Ανάπτυξης).

4.3 Digital economy and ICT policies

Demand for ICT products and services in the Region of West Macedonia is extremely low, due to low income, and the lack of “digital” skills in a large portion of the citizens. According to the “Internet Users in Greece” survey (March 2010)¹⁴ of the Observatory for Digital Greece¹⁵, PC usage and use of the Internet had reached 32% of the regional population. These figures are a clear indication that the ICT penetration is at a good level, always compared to other Greek Regions.

The most notable ICT projects that have been implemented in the recent years were concerned with the implementation of metropolitan access optical networks (MAN) and municipal wireless hot-spots, the development of content for the disabled, digitising of cultural content, and the networking of the higher education institutions and the school units to the national research and education network and the Internet.

A quite small number of ICT SMEs are present in the Region, focusing on system integration, maintenance, and software support for state agencies and for the retail sector. The Region also hosts one University, one Technological Institute and one research institutes, with ICT-related departments.

The Region suffers from considerable and prolonged drain of talented ICT professionals, as the relevant jobs are limited. The young ICT graduates of the local

¹⁴ Ταυτότητα χρηστών internet στην Ελλάδα”, Παρατηρητήριο για την ΚτΠ, Μάρτιος 2010. http://www.observatory.gr/files/meletes/A100526_%CE%A0%CF%81%CE%BF%CF%86%CE%AF%CE%BB%20%CF%87%CF%81%CE%B7%CF%83%CF%84%CF%8E%CE%BD%20internet%202010.pdf

¹⁵ See: <http://www.observatory.gr>

higher education institutions are normally moving to other regions, thus creating additional challenges to any recovery effort.

According to the preliminary strategic directions of the Region¹⁶, the following sectors are best suited to benefit from modern ICT tools and technologies:

Agriculture and animal husbandry: represents a significant portion of the regional economic activity, with sizable growth potential, if combined with modern ICT tools. The Region could focus on distinct products (like Krokos of Kozani) that exhibit proven demand from international markets. The related business units should be encouraged to become more efficient by accommodating modern control, administration, monitoring, marketing, and logistics tools. Added value bio-agricultural and alternative agriculture producers can benefit from internet-based marketplace participation, to widen their distribution channels and optimise branding, procurement, packaging etc. Farmers and livestock unit owners could also be supported to optimise their production activity, by employing modern control and monitoring tools, especially in reducing the cost of energy by using alternative methods, like geothermal resources or biogas.

Food & Beverages: SMEs in food and beverages may improve their profit margins and boost their sales by better branding and advertising, using new-generation ERP and CRM tools, along with e-commerce and procurement platforms.

Energy: the Region produces 45% of the national electricity demand. This huge industry requires several support and maintenance services, offered by SMEs, to cover specialised needs of the production sites. The Region would provide incentives to attract the ICT related SMEs, able to improve the employment profile of the Region.

Tourism: although tourism represents a small portion of the current economic activity, it should be underpinned, due to the fact that the Region has numerous areas of natural beauty and unexploited archaeological and religious sites, capable of attracting a significant number of visitors. SMEs should be motivated to exploit modern technology and synergies to maximize the outreach of the Region, minimise management and advertising costs, and thus create more and better jobs.

E-government and learning: the low level of IT skills in the Region implies that the cost of dealing with the regional public services is enormous for both citizens and regional and national government. Properly designed and interoperable e-government apps would be a major contribution towards efficiency and transparency. These services could be easily combined with proper initial training applications, to overcome the barriers of low IT skills.

Health: health services are beyond reach for several citizens living in remote mountainous locations. This problem can be partially solved by using new telemedicine or home-care services. The Region should provide support to the private sector, to deploy affordable telemedicine or home-care platforms, for selected classes of citizens. These services would be provided as public-private partnerships (PPPs), in cooperation with local state hospitals and health centres, under a proper sustainability model.

Broadband Internet: the availability of affordable broadband connections for all the households is a major European target. The Region should complement all the related national- and EU-level actions, to further extend broadband availability and take-up in the Region. More specifically, it should help making local Industrial Zones/Parks as “FttH-ready”, i.e. bringing fibre to each hosted enterprise. The same can be done for selected neighbourhoods, by connecting the respective households with a passive “open-access” FttH local network. It is also crucial to facilitate additional actions like

¹⁶ “Πρόταση Περιφέρειας Δυτικ'ης Μακεδονίας για τη διαμόρφωση των κατευθύνσεων εθνικής αναπτυξιακ'ης στρατηγικής 2014-2020”, Περιφέρεια Δυτικής Μακεδονίας, Οκτώβριος 2012.

setting-up of public free-access hot-spots in public places, schools, sports/recreation areas, churches, etc. The Region should also investigate ways to improve the utilisation of existing MANs, and provide proper incentives for the expansion of next generation cellular networks (e.g. LTE) in the Region.

Furthermore, the Region may prepare a versatile mechanism, tailored for its particular size and needs, for the substantial involvement of the private sector in the full cycle of project execution and risk sharing. This can be better carried out by flexible PPPs, or by the establishment of targeted ICT Vouchers for selected households or SMEs.

Regarding other specific RIS3 Strategy ICT-related requirements:

- There is currently no detailed regional ICT strategy per sector. In many cases, there may be a balanced allocation, in order to achieve better economies of scale.
- There is no master plan for e-government services. Most of them (cadastre, e-prescription, e-invoicing, etc) are administered by national authorities and, therefore, should be better addressed by a balanced allocation. Other possible e-services, like local taxation or regional permits, would be administered by the Region. All e-government services should adhere to well-defined interoperability standards, and be based on dependable cloud computing platforms¹⁷.
- There is no reference to viable plans for the deployment of new, and the extension of next generation access networks.
- The Region should prepare the creation of an inventory of ICT infrastructure.
- Active involvement of the private sector in ICT activities has to be addressed by the Region, in a way to both leverage community funding and improve sustainability, especially for the delivery of products and services.

5. Monitoring and evaluation

The capabilities for monitoring, evaluation and analysis of innovation programmes and performance should be further solidified and embedded in both the new regional government structures and the wider partnership. A specific budget line could be set aside for a partnership based regional innovation observatory that could fund studies and doctoral/post-graduate research into innovation practice in regional firms, etc.

Guidance on evaluation methodologies for innovation measures is already available for the 2014-20 period¹⁸ and the IMA, regional authorities, etc, should make themselves aware of and use such materials to develop an evaluation plan. At a minimum, one official should be specifically tasked with setting up an evaluation and monitoring system for innovation measures in the IMA.

¹⁷ http://ec.europa.eu/information_society/activities/cloudcomputing/docs/com/com_cloud.pdf

¹⁸ See: <http://bit.ly/Igzx5T>

Appendix A Organisations invited to the RIS3 meeting

Γενικό Γραμματέα Έρευνας και Τεχνολογίας

Περιφέρεια Δυτικής Μακεδονίας

Αντιπεριφερειάρχης ΠΕ Γρεβενών, κ. Γ. Δασταμάνη

Αντιπεριφερειάρχης ΠΕ Καστοριάς, κ. Δ. Σαββόπουλο

Αντιπεριφερειάρχης ΠΕ Κοζάνης, κ. Ι. Σόκουτη

Αντιπεριφερειάρχης ΠΕ Φλώρινας, κ. Δ. Ηλιάδη

Αντιπεριφερειάρχης Προγραμματισμού και Ανάπτυξης, κ. Ι. Αντωνιάδη

Αντιπεριφερειάρχης Οικονομίας και Φυσικού Περιβάλλοντος, κ. Π. Χαρούμενο

Αντιπεριφερειάρχης Κοινωνικής Συνοχής, κ. Α. Κοσματόπουλο

Εκτελεστικό Γραμματέα, κα Α. Τσάτσου

Ομάδα Σχεδιασμού Προγράμματος Ανάπτυξης Περιφέρειας Δυτικής Μακεδονίας
2014 – 2020

Γενικό Διευθυντή Αναπτυξιακού Προγραμματισμού, Περιβάλλοντος & Υποδομών
Περιφέρειας

Δυτικής Μακεδονίας, κ. Π. Οικονομίδη

Διεύθυνση Αναπτυξιακού Προγραμματισμού, Γραφείο Διευθυντή κ. Ζ. Πιτσέλη

Περιφερειακό Ταμείο Ανάπτυξης, Γραφείο Δ/ντή κ. Β. Κωτούλα

Περιφερειακή Ένωση Δήμων Δυτικής Μακεδονίας, Γραφείο Προέδρου κας Π.
Βρυζίδου

ΕΒΕ Γρεβενών

ΕΒΕ Καστοριάς

ΕΒΕ Κοζάνης

ΕΒΕ Φλώρινας

Εκθεσιακό Κέντρο Δυτικής Μακεδονίας

Ελληνική Ομοσπονδία Γούνας

Ε.ΔΗ.ΚΑ ΑΕ

ΔΕΗ ΑΕ

ΤΕΕ, Παράρτημα Δυτικής Μακεδονίας

ΓΕΩΤΕΕ, Παράρτημα Δυτικής Μακεδονίας

ΟΕΕ, Παράρτημα Δυτικής Μακεδονίας

ΣΒΒΕ

Πανεπιστήμιο Δυτικής Μακεδονίας

ΤΕΙ Δυτικής Μακεδονίας

ΚΤΕ ΤΕΙ Δυτικής Μακεδονίας

ΕΚΕΤΑ/ΙΤΕΣΚ

ΚΕΠΕ

ΙΓΜΕ

ANKO AE, AN.ΓΠΕ AE, AN.ΚΑΣ AE, AN.ΦΛΩ AE
ΔΙΑΔΥΜΑ AE

Appendix B List of key documents and reference materials consulted

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<http://metrics.ekt.gr/en/reporto2/index>

Appendix C Key Actors in the regional innovation system

Leading Businesses:

Public Power Corporation (DEI) (extended mines excavating 50 Mio tns of lignite, 5 Power Stations that produce 4,5 GW of electric power, more than 200 SME's cooperating), B&T Composites, Kapa Dynamic, Afentoulidis, Alpha Estate, Pavlou Estate, Ioanni Chatzi Winery, Pitenis, Alfa, Dioskourides, Vieikko, Maviz, Asepov Velvendou, Exporel, Panamarm, Lithos Mosaics, Arosis, Veikos, Naoumidis, Ktinotrofiki Florinas, Xinonero, Alfa Wood, Elyn, Giotas, Kourellas, Cooperative of Safran of Kozani, Agricultural Cooperative of Aromatic Plants and Vegetables of Voiou, Agricultural Cooperative of Processing and Selling Horticultural Products 'UNION', Agricultural Cooperative of Women of Agios Gerogios Grevena, Agricultural Cooperative of Velventou, Agricultural Cooperative of Women of Velventou.

Key Research Actors:

The research fabric is mainly composed of University of West Macedonia, the Technological Educational Institute of West Macedonia in Kozani, Florina, Grevena and Ptolemaida, the Centre of Technological Research, the Institute of Solid Fuel Technologies & Applications of CERTH and the Institute of Geology & Mineral Exploration.

Financing:

Cooperative Bank of Dytiki Macedonia

Incubators, Industrial Areas/Zones/Parks

Industrial Zone of Florina and planned Industrial Zones of Kozani and Kastoria.

Principal Intermediaries:

Hellenic Fur Federation, Federation of Industries of Northern Greece, Chamber of Commerce & Industry of Grevena, Kastoria, Kozani, Florina, Economic Chamber (Chapter of West Macedonia), Technical Chamber of Greece (Chapter of West Macedonia), Geotechnical Chamber of Greece (Chapter of West Macedonia), Environmental Center (KEPE), Waste Management of West Macedonia, Regional Development Agencies of West Macedonia (ANKO), Kozani, Grevena, Kastoria, Florina, Unit of Innovation and Entrepreneurship of the University of West Macedonia, Agrotourism Union of West Macedonia, Hoteliers Association of Kastoria, Kozani, Florina, Exhibition Centre of West Macedonia, Exhibition Centre of Kastoria (Edika), etc.

Appendix D Regional RTDI funding under the OP Competitiveness and Innovation

Allocation by region of GSRT grants for RTDI projects (State Aid) under the OP Competitiveness and Innovation

Region	Enterprises	Research organisations	Other entities	Grand Total	% share
Attiki	€ 78,383,203	€ 33,291,462	€ 480,411	€ 112,155,076	47.4%
Central Macedonia	€ 22,588,727	€ 13,566,039	€ 38,300	€ 36,193,066	15.2%
Western Greece	€ 22,841,816	€ 8,901,221	€ 7,000	€ 31,750,037	13.4%
Crete	€ 3,623,524	€ 13,728,214	€ -	€ 17,351,738	7.2%
Stereia Ellada	€ 9,388,903	€ 1,397,119	€ -	€ 10,786,022	4.6%
East Macedonia & Thrace	€ 5,886,928	€ 1,864,884	€ 25,090	€ 7,776,902	3.3%
Thessaly	€ 4,648,471	€ 2,134,643	€ 253,000	€ 7,036,114	3.0%
Epirus	€ 2,403,100	€ 1,887,252	€ -	€ 4,290,352	1.8%
Peloponnese	€ 3,382,986	€ 545,200	€ -	€ 3,928,186	1.7%
North Aegean	€ 1,813,280	€ 425,506	€ -	€ 2,238,786	0.9%
West Macedonia	€ 1,355,665	€ 524,695	€ -	€ 1,880,360	0.8%
Ionian Islands	€ 388,000	€ 120,000	€ -	€ 508,000	0.2%
South Aegean	€ 476,000	€ -	€ 18,750	€ 494,750	0.2%
Grand Total	€ 157,180,603	€ 78,386,235	€ 822,551	€ 236,389,389	100%
	66.5%	33.2%	0.3%		

Source: data received from the GRST on 10 October 2012. Calculations authors.

Appendix E Share of total gross value added by sector - West Macedonia

% of Total Gross value added at basic prices	2005	2006	2007	2008	2009
A - Agriculture, forestry and fishing	7,38	5,54	5,42	4,63	4,62
B-E - Industry (except construction)	40,97	43,20	44,75	43,48	44,09
C - Manufacturing	3,47	4,43	4,35	3,92	4,66
F - Construction	7,88	8,46	7,01	6,37	6,10
G-I - Wholesale and retail trade, transport, accommodation and food service activities	13,89	14,02	14,30	15,67	14,22
J - Information and communication	1,30	1,47	1,25	1,11	1,25
K - Financial and insurance activities	2,39	2,28	2,06	1,95	2,20
L - Real estate activities	6,04	5,63	5,69	6,19	6,42
M_N - Professional, scientific and technical activities; administrative and support service activities	2,63	2,75	2,71	2,51	2,41
O-Q - Public administration, defence, education, human health and social work activities	14,60	13,47	14,07	15,15	15,65
R-U - Arts, entertainment and recreation; other service activities; activities of household & extra-territorial organisations and bodies	2,91	3,17	2,74	2,94	3,06
TOTAL - All NACE activities - in Millions of Euros	4.124,3	4.434,8	4.843,1	4.936,7	4.911,4

Source: Eurostat

Appendix F Relative regional specialisation in 20 industries – West Macedonia

	Industry	Rank in Europe	Specialisation	Employment
1	Mining and agglomeration of lignite	1	109.39	5 836
2	Dressing and dyeing of fur; manufacture of articles of fur	1	407.63	5 198
3	Production and distribution of electricity	1	6.60	3 743
4	Mining and agglomeration of hard coal	7	7.32	1 028
5	Farming of animals	10	4.93	2 621
6	Growing of crops; market gardening; horticulture	12	8.12	13 696
7	Secondary education	13	2.66	4 356
8	Adult and other education	16	2.37	1 725
9	Retail sale of food, beverages and tobacco in specialized stores	17	2.04	2 217
10	Manufacture of other food products	21	1.73	2 037
11	Primary education	30	2.10	4 560
12	Manufacture of articles of concrete, plaster and cement	32	2.03	514
13	Bars	47	1.96	2 100
14	Site preparation	55	1.76	549
15	Provision of services to the community as a whole	69	1.54	2 095

Source: Smart specialisation in Europe: European specialisation data by region Centre for Strategy and Competitiveness, Stockholm School of Economics, April 2011