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Setting up the innovation support mechanisms and increasing awareness on the potential of Food Innovation and RTD in the South-East Europe area

Project Code: SEE/B/0028/1.3/X

WORK PACKAGE 4: SETTING UP MECHANISMS FOR BOOSTING FOOD INNOVATION

D4.2- Operational Plans for food RTD and innovation

Partner	Official name (in English)	Abbreviation	Country
LP	Centre for Research and Technology Hellas- Institute of Applied Biosciences	CERTH-INAB	Greece
ERDF PP1	Federation of Industries of Northern Greece	FING	Greece
ERDF PP2	National Research Council- Institute of Sciences of Food Production	CNR/ISPA	Italy
ERDF PP3	Agricultural University of Plovdiv	AUP	Bulgaria
ERDF PP4	Pazardzhik Regional Administration	OAP	Bulgaria
ERDF PP5	National Institute of Research & Development for Food Bioresources	IBA	Romania
ERDF PP6	Constanta Chamber of Commerce, Industry, Shipping And Agriculture	CCINA	Romania
ERDF PP7	Development Agency of Idrija and Cerkno	ICRA	Slovenia
ERDF PP8	European Food Chain Parliament-Foodlawment	EEPF	Hungary
10% PP1	Odessa National Academy of Food Technologies	ONAFT	Ukraine
10% PP2	Chamber of Commerce and Industry of the Republic of Moldova	CCIRM	Republic of Moldova
10% PP3	Institute for Food Technology	FINS	Serbia

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Abstract: The current report includes the Operational Plans for food research, technological development and innovation developed in the participating Inno- Food SEE regions as well as the suggested transnational measures and activities.

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EXECUTIVE SUMMARY

The current report includes the Operational Plans for food research, technological development and innovation developed in the participating Inno- Food SEE regions as well as the suggested transnational measures and activities.

As per the Application Form the partners developed Operational Plans for RTD activities that will drive economic development in the Food sector, defining several measures such as:

- Supporting researcher mobility especially towards the Industry;
- Improvement and more efficient use of existing R&D infrastructure;
- Development of R&D projects funded either by National Funds or FP7;
- Matching of R&D results with R&D needs between research entities and Food SMEs;
- Networking between the involved actors and at a wider level with selected institutions and organisations from around Europe;
- Assistance to SMEs to more efficiently access business support schemes.

The network of stakeholders and decision makers was involved in the process by providing ideas and feedback and by supporting the development of the Operational Plans with the capacity and institutional role. The Operational Plan also includes a definition of synergies and common activities of a transnational SEE character.

The majority of proposed measures refer to Knowledge Diffusion, followed by Knowledge Exploitation and Knowledge Generation and they match common characteristics in the Inno- Food SEE regions such as need for awareness- raising on food innovation potential; a practical approach to problem solving in the food industry; a focus to widespread cooperation with all members of the agrofood value chain (clustering and development of synergies).

The analysis of the target groups of the proposed measures shows that the majority of actions involve SMEs, either exclusively but in the majority of cases in combination with research entities and other actors such as accreditation and standardization bodies, support services, funding institutions, consumer associations, technology consultants, etc. A significant number of actions also involve farmers and their associations, a fact which highlights the understanding of an integrated approach to the entire agrofood chain. Finally, many activities relate to upgrading Human Resources for the agrofood sector; in particular activities related to a) upgrading of academic curricula, b) training and coaching of SMEs personnel in innovation management, c) industrial PhDs, etc.

It is envisaged that these Operational Plans can be suggested to regional and national authorities and form part of the debate for the development of the various instruments introduced in the upcoming Programming Period 2014-2020.

1. INTRODUCTION AND METHODOLOGY

In the framework of this activity, the partners developed ideas for 'Operational Plans for supporting food innovation' in their regional context with a view to promoting knowledge-based economic development in the agrofood sector. It is envisaged that these Operational Plans will be presented and suggested to regional and national authorities as a part of the debate for the development of the various instruments introduced in the upcoming Programming Period 2014-2020.

Methodology

Phase 1: The Inno- Food SEE partners used the results of D3.3 and D3.4 and developed a set of suggestions for the measures that could be included in the Operational Plans. The partners used a standard template for drafting the measures to enable their easier presentation to the regional stakeholders and decision makers.

Phase 2: A meeting with the selected stakeholders and decision makers per region/ country was organised to feed the consultative process for the development of the Operational Plans. The stakeholders and decision makers received the suggested measures beforehand, thus the meeting was dedicated to discussing the measures.

Phase 3: A meeting of 2-3 stakeholders and decision makers per each region/ country was organised in order to feed the consultative process for the development of the Operational Plans and to propose measures on a SEE/ regional level. This took place in the final project Conference in Bari- Italy.

Phase 4: In this final step the Inno- Food SEE partners synthesised the feedback from the previous phases in the current report.

2. REGION OF CENTRAL MACEDONIA

2.1 DESCRIPTION OF THE REGIONAL CURRENT STATE OF PLAY

The Agrofood sector is particularly advanced in the **Region of Central Macedonia**, both in terms of the primary agricultural production as well as the food and manufacturing industry.

2.2.1 AGRICULTURE

The region accounts to approximately 21% if the national output of agriculture. Cereals, industrial crops, fruits and animal products are of particular importance for the regional economy and compared to the national averages. The table below present some key figures for the agricultural sector of the Region of C. Macedonia:

Table 1- Agricultural sector key statistics in the Region of Central Macedonia, (Source, Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database)

Agricultural product/ Item	Average annual production value 2006-2009, (in millions of €)	Percentage of national output (average 2006-2009)
Fruits	659,56	39%
Animal Products	312,43	24%
Cereals (Including Seeds)	299,24	31%
Vegetables and Horticultural Products	255,76	14%
Animals	252,53	18%
Industrial Crops	169,79	28%
Agricultural Services Output	79,80	21%
Total Output of the Agricultural 'Industry'	2.252,34	21%

Without doubt, the favourable geographical position of the Region of Central Macedonia is a strong advantage along with the significant Greek investing activity in the Balkan area. Nevertheless the Region has not yet developed a clear productive identity at an international level nor has it secured an immediate access to the big Central European markets for it products and services[1]. Despite the fact that the Region features a large variety of agricultural products of critical mass and strong local agricultural specialisation, the primary agricultural sector is falling behind when it comes to its linkages and relationships with technology and innovation, food manufacturing, certification, standardisation, trade and commerce.

The main challenges for the agricultural sector *(Source: "Operational Plan for the Region of Central Macedonia 2012- 2014- Strategic Planning")* are:

- The adoption by farmers and agricultural cooperatives of innovative technologies, new certification procedures and standardisation methods.
- The efficient and effective technical and organisation support of farmers by cooperatives, the state and agronomist experts;
- The restructuring of the agricultural sector and the efficient utilisation of raw materials;
- Organisational dysfunctions and weaknesses in the operation of agricultural cooperatives;

[1] Adapted from the "Operational Plan for the Region of Central Macedonia 2012- 2014- Strategic Planning", August 2011, http://goo.gl/70Y6M.

- Dysfunctions related to the coordination of services and management units for the implementation of programmes for rural development;
- The low level of business cooperation and synergies with the food processing sector.

2.2.2 FOOD INDUSTRY

The food and beverages manufacturing industry in the region of Central Macedonia accounts for a significant part of the economy. A significant number of companies with intense exporting character are active in the region. The food companies of the region constitute around 14% of the total number of food industries in Greece; they provide 26% of the employment in the region's industry. Similarly the beverage companies of the region constitute around 14% of the total number of beverage industries in Greece and provide 2.8% of the employment in the region's industry.

Table 2- Food and beverage industry key statistics in the Region of Central Macedonia, (Source, Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database, Year 2009)

Parameter		Unit	Percentage of national total	Share of employment in manufacturing total
Food manufacture	Number of companies	2,265	23%	26%
	Number of persons employed	18,453	23%	
Beverage manufacture	Number of companies	136	14%	2.8%
	Number of persons employed	1,993	19%	

Food manufacturing has until recently accounted for a significant portion of the economy. Nowadays it follows a declining course which is intensified by the global financial and economic crisis. The competitiveness deficit of the secondary sector is among others the result of delays in the implementation of basic infrastructure for the traffic of goods, the unfavourable administrative and investing environment.

The food and drink sector in the Region of Central Macedonia is a traditional economic sector. The majority of the companies are small and medium- sized; many are family owned. Most of the companies lack the strategic vision and the resources to invest in Research and Development. R&D investment of food and drink manufacture has traditionally been relatively low in comparison to other industries.

The food and drink sector is exposed to European and international competition from companies that offer more competitive prices and/ or products with significant added- value. In order to keep up with the competition, SMEs need to push forward with significant innovation and technology investments in cooperation with research institutes and technology providers.

The main challenges for the food industry *(Source: "Operational Plan for the Region of Central Macedonia 2012- 2014- Strategic Planning")* are:

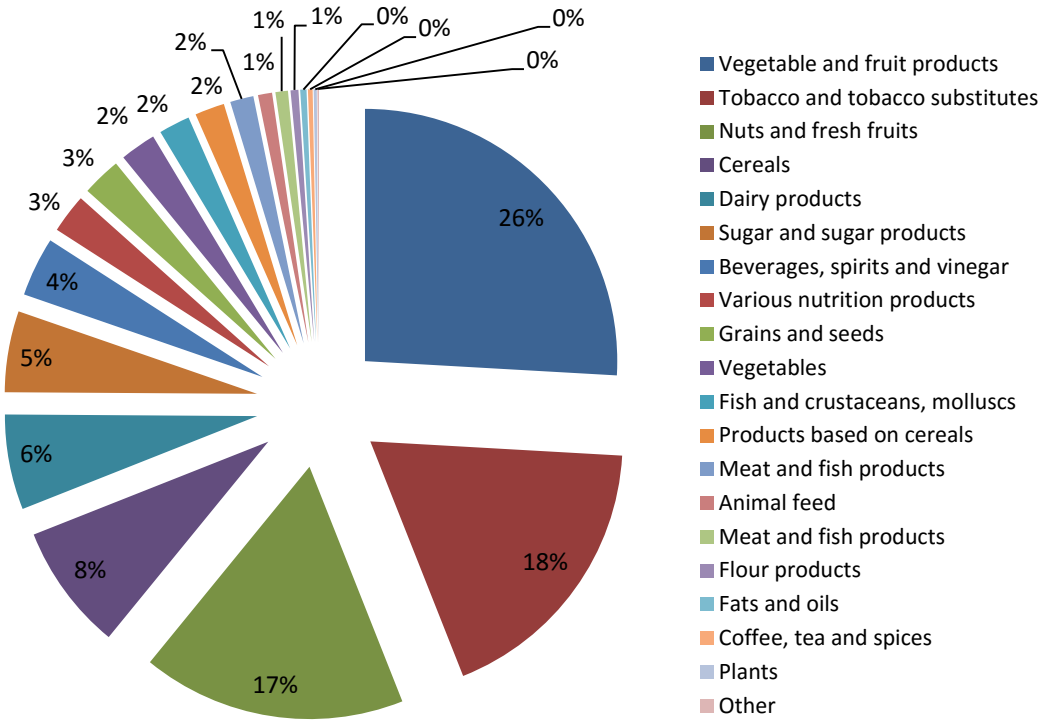
- The development of favourable, viable and operational synergies between the primary agricultural sector and the secondary food manufacturing sector;
- The restructuring and rationalisation of the production processes;
- The reduction of the production cost in the primary agricultural and the secondary manufacturing AgroFood sector;
- The standardisation of products and the enhancement of their quality;
- The diversification of products according to consumer needs;
- The valid assessment of the technology and know- how needs of the SMEs with regard to the adoption of innovation and technological solutions;
- The enhancement of cooperation between food industry and research entities;
- The increase in the demand, use and finance of research and innovation projects.

2.2.3 EXPORTS OF AGRICULTURE AND FOOD PRODUCTS

Agricultural and food products of the Region of Central Macedonia accounted for 1.2 billion worth of exports in 2010, approximately 35% of the total national exports and well above the second (Region of Attica, approximately 20% of national total). An analysis of the value of exports by type of agricultural product is presented below:

Table 3- Exports of agricultural and food products by type from the Region of Central Macedonia, in thousands of euros, Year 2010 (Source: Institute of Export Surveys and Studies, Federation of Exporters of Northern Greece)

Type	Thousands of euros	Share of total	Change 2006-2010
Vegetable and fruit products	309.383	25,9%	4,6%
Tobacco and tobacco substitutes	215.846	18,1%	-4,5%
Nuts and fresh fruits	201.085	16,9%	3,1%
Cereals	97.033	8,1%	2,7%
Dairy products	72.695	6,1%	17,8%
Sugar and sugar products	61.619	5,2%	51,6%
Beverages, spirits and vinegar	45.797	3,8%	1,7%
Various nutrition products	30.100	2,5%	-4,1%
Grains and seeds	29.771	2,5%	15,8%
Vegetables	27.463	2,3%	-2,4%
Fish and crustaceans, molluscs	23.266	2,0%	-12,0%
Products based on cereals	22.632	1,9%	3,8%
Meat and fish products	17.687	1,5%	-6,2%
Animal feed	10.775	0,9%	14,5%
Meat and fish products	9.442	0,8%	39,8%
Flour products	5.375	0,5%	11,1%
Fats and oils	5.136	0,4%	11,4%
Coffee, tea and spices	3.960	0,3%	34,9%
Plants	2.357	0,2%	5,5%
Other	1.607	0,1%	-30,9%
Total	**1.193.028**	**100,0%**	**2,9%**



Graph 1- Share of agricultural and food products exports, Region of Central Macedonia, 2010 *(Source: Institute of Export Surveys and Studies, Federation of Exporters of Northern Greece)*

Data concerning the main export destinations of the agricultural products of the Region of Central Macedonia were not made available. At a national level the main export destinations for agricultural products (year 2007) are Germany (16.7% of national total), Italy (13.8%), Great Britain (7.5%), USA (6.3%), Cyprus (4.9%), Bulgaria (4.6%), Netherlands (3.2%), Russia (3%), etc. [2]

2.2 KEY POINTS FROM THE SWOT/ SOR ANALYSIS AND POLICY RECOMMENDATIONS REPORT

The **key comments- findings** of the round- table synthesis meeting organised at the premises of the Federation of Industries of Northern Greece (FING) on the 25th of September 2013 are presented below, in an effort to categorize them by each of the four key questions:

Question 1: What are major challenges for the competitiveness of the food industry of Central Macedonia and Northern Greece in general? Which challenges could be dealt with by utilizing technological solutions, introducing innovation, technology transfer by cooperating with research entities and institutes?

- The majority of the food industries in the Region of Central Macedonia are focusing on innovation techniques and results related to **New Product Development**;

[2] Study for the export activity of agricultural products sector", 2008, (Source: Institute of Export Surveys and Studies, Federation of Exporters of Northern Greece).

- New Product Development and **"marketing" innovation** is considered to provide more immediate results than "technological" innovation;
- Every food industry has **different innovation needs**; it is necessary to approach each one with these specificities in mind in order to reach to sustainable innovation cooperation and results;
- The researchers highlighted the significance of the food companies acquiring access to the **analytical methods and tools** that they provide; INEB- CERTH has actually started with the **accreditation of their entire set of services provided to companies** (e.g. DNA labeling); access to such services can thus provide a true competitive advantage to companies;
- The implementation of **pilot units and infrastructure for the testing** and development of new food products was also highlighted;
- The definition of innovation for the majority of the companies is synonym for the **fulfillment of consumer needs**; a number of examples from the dairy industry were presented;
- Food companies are in particular interested in **"synergistic" innovation**, i.e. one that serves different purposes at the same time, e.g. packaging of products that a) serves the practicalities of food preservation, transport, hygiene, etc., b) acts as a marketing and promotional tool to the consumer and c) has a minimal environmental and energy footprint;
- Food companies are in particular interested in **food innovation that combines and exploits various productions streams and lines**, e.g. the utilization of the dairy industry by- products for the production of useful and added- value products such as refreshments with high protein content (Prof. Kouretas, University of Thessaly);
- In most cases the **key "source" of innovation for the food industry are the suppliers of equipment and particular food experts/ technicians** that support companies e.g. in the setting up of a new production line; cooperation with research entities is less frequent as in most cases they do not exhibit the level of flexibility and reactiveness requested by the industry;

Question 2: What in your opinion would trigger the decision of the regional food industry to invest money, time and human resources in the development of research and innovation projects?

- **Consumer trends drive innovation in the food industry**; the food industry will participate in RTD projects if they see the potential for the development of a market requested product;

- The food industry is a “traditional” industry with modest investments in RTD; it is **not considered a hi-tech industry**, most solutions are at the level of implementing best practices and techniques;
- The current **economic environment** makes companies even more selective about RTD investments;
- Incentives for the implementation of RTD and innovation projects, e.g. **tax deductions and exemptions** are significant; however this regime should be clarified so that more companies take advantage;
- Schemes for the **mobility of researchers towards the industry** should be a key instrument in linking the academic community with the industry;
- The research community should focus more to the development of **services** specially designed for the needs of the national food industry;
- Research and academia should focus on the **accreditation** of their innovation and analytical **services**, the delivery of services for the **training of personnel** to new innovative techniques, etc.

Question 3: Which in your opinion are the major obstacles for the food industry in the implementation of research and innovation projects?

- **Market conditions** should improve, e.g. **state regulations** about different industry sectors create problems in the implementation of various project ideas;
- **Public administration** bureaucratic procedures and constant changes often hinder the positive forward- looking initiatives of the private sector;
- Food companies are of the opinion that it is not necessary to develop a standard-typical research project in order to reach to the objective, i.e. tangible new products, improvements, etc. **Smaller in focus and targeted initiatives** are perhaps more suitable for the needs of the particular companies;
- The majority of companies produces **low or middle technology products** and thus rarely relate with the hi- end innovation propositions of the research community; there is a need for valid assessment and definition of their innovation needs and a more **realistic approach** by the researchers;
- A **systematic and professional approach** is necessary on order to reach to tangible results as it is quite usual that similar cooperation efforts between research and industry are not being systematically followed up;

- **Researchers should become more extrovert and open** to look into the actual needs of the companies; they should focus more to the development and implementation of services for the companies;
- The identification, analysis and promotion of **food innovation success stories** are important as it can help boost cooperation.

Question 4: How in your opinion should the food industry promote its positions and interests with regards to the promotion of research and innovation?

- **Connecting the academic community and the industry** should be the major focus of all initiatives related to innovation; in this sense, it is important to create common interests among the two parts and bring them together in order to discuss the problems and the perspectives of the industry;
- It was suggested that **a forum of regional stakeholders from industry, research-academia, agencies and authorities, consumers and special groups, consultants, etc. focused to food innovation is created**; this should convene regularly and systematically push the agenda for cooperation; it should act as a platform for the exchange of information and opinions and as an opportunity for technology transfer based on request and offer;
- The idea of reviving the **BioAgroFood- BAF Cluster** was discussed; it was suggested that a more modest and less expansive and ambitious approach (i.e. the aforementioned food innovation forum) can be quite effective as a start and act as a catalyst for the development of the BioAgroFood Cluster;
- The participants noted that they see benefit in this type of cooperation and they would **proceed in similar networking activities regardless of the availability of funding** as a means of the facilitation of clustering; nevertheless they see funding as necessary for the development of actual research projects;
- In order for various forums, associations, etc. to operate successfully it is necessary for all to **share a common vision and interest** and that none is trying to force its interests and agenda over the others;
- **Educating the customer** is very important; it should start from the very early ages; it is important because it highlights the importance of **quality of local foods, their originality and traditional character** and promotes quality- traditional- local food to a growing clientele;
- The food industry is very much interested in the development of **food products specially designed for specific target groups** (diabetics, celiacs, athletes, pregnant

women, etc.); personalized nutrition is considered the future of the food industry and they need the support of the research community for new product development;

- It was suggested that food SMEs and research units are combined in various **"thematic" and "technological" groups** in order to set the basis of a systematic and regular cooperation among them;
- Food companies consider **in- depth food market surveys** as very valuable and significant for their needs;
- It is suggested that national research funding is based on ***results***, e.g. creation of new companies, creation of new job positions, added- value for companies, etc.
- Entrepreneurial risk- taking related to investment in innovation should be rewarded; an **Innovation Fund** with a strong regional character should be established;
- **Technology brokerage** should be reinforced; it is important to **systematically map** the **innovation capacities** of the regional research institutes and **innovation needs** of the industry;
- Regional and national **infrastructure** is of paramount importance (roads, ports, airports, telecommunications, etc.) for the implementation of innovative solutions and the better and quicker transfer of goods;
- It is important that the "food innovation forum" that emerges from this initiative pushes forward particular measures to be included in the forthcoming programming period 2014- 2020; the process of developing the new **regional Operational Programmes** and the related **smart specialization strategy** is underway; primary agricultural production and food processing are traditionally among the key regional priorities;
- It was suggested that the regional Operational Programmes are more **focused and pragmatic** (in comparison to the national- wide ones); the priorities should be relevant to the regional needs and capacities (smart specialization strategy);
- A new paradigm to the organization and operation of **agricultural cooperatives** is needed in order to ensure the maximization of the benefits for both producers and the food industry.

General comments and suggestions

- The food industry considers it as very important valuable to cooperate with research entities in order to better understand and highlight the **positive health effects** of their products;
- It was recognized by both the food industry and the research community representatives that they urgently **need to discuss and cooperate** so that a) SMEs

clearly express and validate their exact needs and b) research entities clearly present their results and the areas where they can become useful for SMEs;

- It was suggested by food industry representatives that significant problems exist with regards to the **non- availability of raw materials for food production on a national level**, e.g. approximately 60% of milk and more than 80% processed and consumed in Greece of meat is imported; this practically means that a lot of potential added- value in the entire food production chain is lost for the country; therefore it is of outmost importance to strengthen the national primary production capacity so that it better serves the national food industry needs and to reinforce the cooperation of primary and secondary food production by means e.g. of the development of **contract farming agreements**, etc.
- It is important that **each region specializes in the food production** in which it has a competitive advantage, e.g. regions of Central Greece are more suitable to the production of goat and sheep milk products; the region of Central Macedonia is more suitable for cow milk products;
- Regions of Greece cannot compete with the bigger and more productive regions of Central and Western Europe in terms of volume of production; thus it is necessary to **specialize in food product varieties and quality**;
- Food production for export should focus to areas where the country and the region exhibit **competitive advantages** and to differentiate with high quality, specialty foods, e.g. **Protected designation of origin** (PDO) products; it is impossible to compete with products from other countries with bigger agricultural areas, bigger markets and large “economies of scale”;
- It is important that more food companies’ staff is **actively involved** in the **entrepreneurial innovation discovery process**; this cannot only be a task of executives or engineers; many different disciplines should be combined to reach to the expected results.

2.3 DESCRIPTION OF KEY MEASURES

Name of the measure	BioAgroFood Cluster
Region	*Central Macedonia (Greece)*
Timeframe	Medium Term (2- 5 years)
Rationale	Worldwide, consumers' need to turn to a more healthy way of nutrition in order to decrease the development of serious illnesses and also to prevent pathological situations creates new trends in Food industry for new products. These innovative products address to different groups of consumers and are related to new food needs and trends, new life styles and social standards. Furthermore, specialized foods are among these products that bring food companies to new markets and can boost the sales. A future estimation of the market is of $300 billion within the next 10 years. Such a fast growing market leads to an increase of the demand for innovative food products which has as a consequence the increasing pressure for research, development and production in the field. Similar is also the trend for the Greek Food Industry. The Greek Bio-Agrofood Cluster (BAF Cluster) aims to the research, technology development and organization for the production of innovative food products for specific groups of consumers. The base of the Bio-AgroFood Cluster is the: Scientific and technology excellence, human resources and new farmers, small and large food industry, the experience in contractual agriculture, the natural environment of our country and the well-posted groups of consumers.
Particular sector and subsector	Agriculture, Food Processing, Food Industry, Biotechnology
Objectives	➢ To enhance the quality of Greek products for specific target groups of consumers such as diabetic people, pregnant women etc. as a first approach to the personalized nutrition. ➢ The incorporation of the obtained knowledge from the genomics progresses, especially those of the sequencing and analysis of multiple genomes of microorganisms, plants, animals as well as human in the food productive process. ➢ The fulfilment of our country need for more qualitative products, in accordance with the governmental and latest European policy of EU, where the consumers' needs guide the food industry in the concept "from fork to farm" and reorganizing the productive and industry process by connecting the agricultural production with the industry and the consumers ➢ Support of the regional economy according to the basic aims of the National Plan for Regional Development, preserving and creating employment, increasing the annual income and therefore the quality of life of the rural population.
Core activities	The cluster has a lot and variable actions such as research and development, creation of spin-offs, access to research infrastructure to companies etc. In the realization of the Bio-AgroFood Cluster participate a wide range of organizations such as research and technology organizations, educational organizations, Industries and specific consumer groups.
Implementing entity	Region of Central Macedonia or General Secretariat for Research and Technology
Financial resources	Regional Operational Plans or National Research and Technology

	Programme
Target groups	Agrofood SMEs, research entities, consumer associations, special target groups, regional authorities, investors, consultants, media, etc.
Indicators for implementation success	- Number of entities participating - Grants, funds and investments directed to the cluster - Number of patents/ number of spin- off

Name of the measure	Standardisation and upgrade of local agrofood products
Region	*Central Macedonia (Greece)*
Timeframe	Medium Term (2- 5 years)
Rationale	Local agrofood products can better penetrate new markets and significantly increase their market value by means of standardisation, quality control, marketing, etc. and by highlighting their special organoleptic characteristics (Products with protected designation of origin- PDO)
Particular sector and subsector	All sectors but particularly of products with special organoleptic characteristics and regional character
Objectives	➢ To increase the market value of local agrofood products ➢ To increase of exports of local agrofood products
Core activities	- Support in the standardisation of agrofood products - Accreditation of agrofood products by use of specific food standards - Validation of food origin, by means of DNA labelling and other tracing methods - Upgrading of safety features of agrofood products
Implementing entity	Region of Central Macedonia
Financial resources	Regional Operational Plans
Target groups	Farmers, agrofood companies, research entities, innovation support services providers, standardisation and accreditation bodies
Indicators for implementation success	Increase of exports of local agrofood products and increase in their market value

Name of the measure	Support of research cooperation projects
Region	*Central Macedonia (Greece)*
Timeframe	Medium Term (2- 5 years)
Rationale	Agrofood companies face particular technological challenges; they constantly need to upgrade their variety of products to meet customer needs, ensure the safety of products, minimize cost and optimise their production.
Particular sector and subsector	All agrofood sectors
Objectives	➢ To develop new agrofood products ➢ To minimise production costs ➢ To minimise environmental footprint ➢ To ensure food safety ➢ To meet food standards
Core activities	Development of cooperation projects engaging agrofood companies, research entities and support entities. Areas may cover: - Adoption of standard food technologies in food production - Adoption of Biotechnology and genomics in food production - New methods of ensuring food safety - Improvement of seeds; improvement of animal capital - New innovative and functional packaging, new methods for the preservation and transport of food - Energy conservation and use - Minimisation of environmental impact - ICT applications, automation, RFID technologies - Food chain logistics - Organisational innovation, branding, marketing, etc.
Implementing entity	Region of Central Macedonia
Financial resources	Regional Operational Plans
Target groups	Agrofood companies, research entities, , innovation support services providers, standardisation and accreditation bodies
Indicators for implementation success	Increase of the competitiveness of food companies, increase in food exports, increase of related jobs.

Name of the measure	Innovation Vouchers
Region	*Central Macedonia (Greece)*
Timeframe	Short term (1-3 years)
Rationale	Many smaller food companies are of the opinion that it is not necessary to develop a standard- typical research project in order to reach to the objective, i.e. tangible new products, improvements, etc. Smaller in focus and targeted initiatives are perhaps more suitable for the needs of the particular companies.
Particular sector and subsector	All agrofood sectors
Objectives	➢ To resolve particular focused technological problems of the agrofood companies
Core activities	- Agrofood companies are subsidised for the purchase of particular services and solutions of a focused and targeted nature. Activities engage usually one company and one research entity or innovation support services provider
Implementing entity	Region of Central Macedonia
Financial resources	Regional Operational Plans
Target groups	Agrofood companies, research entities, innovation support services providers
Indicators for implementation success	- Participation of agrofood companies - Degree of project success

Name of the measure	Mobility schemes for researchers to agrofood companies
Region	*Central Macedonia (Greece)*
Timeframe	Short term (1-3 years)
Rationale	The interaction of research and industry should be systematically enhanced, Schemes for the mobility of researchers towards the industry is a key instrument. This would allow companies to acquire know- how and a valid assessment of their technological and innovation needs and at the same time highlight these challenges to researchers/ research entities so that they better focus more to the development of services specially designed for the needs of the regional and national food industry
Particular sector and subsector	All food sectors
Objectives	➢ To enhance research and industry cooperation ➢ To help map the technological challenges of agrofood companies ➢ To help resolve particular technological problems of companies ➢
Core activities	Supporting industrial PhDs, i.e. placement of researchers in agrofood companies with a particular project to be developed.
Implementing entity	Region of Central Macedonia or General Secretariat for Research and Technology
Financial resources	Regional Operational Plans or National Research and Technology Programme
Target groups	Agrofood companies, research entities, innovation support services providers
Indicators for implementation success	- Participation of agrofood companies - Degree of project success

Name of the measure	Support in the development of analytical laboratories and related services
Region	*Central Macedonia (Greece)*
Timeframe	Medium term (2-5 years)
Rationale	Agrofood companies would particularly benefit by acquiring access to accredited analytical methods and tools, pilot units and infrastructure for standardization, testing and development of new food products and quality control.
Particular sector and subsector	All food sectors
Objectives	➢ To facilitate standardisation of food products to meet various standards set by the international markets ➢ To support the development of new food products
Core activities	- Supporting the development of infrastructure such as analytical laboratories, pilot units, etc.
Implementing entity	Region of Central Macedonia or General Secretariat for Research and Technology
Financial resources	Regional Operational Plans or National Research and Technology Programme
Target groups	Agrofood SMEs, research entities, clusters, etc.
Indicators for implementation success	- Number of new food products developed - Number of agrofood companies serviced by the laboratories and pilot units

Name of the measure	Financial measures for the development of spin- offs and start-ups for the agrofood sector
Region	*Central Macedonia (Greece)*
Timeframe	Medium term (2-5 years)
Rationale	Research ideas need time, effort and particular support in order to materialise to innovation, products and services.
Particular sector and subsector	All food sectors
Objectives	➢ To provide initial funding for the development and marketing of ideas focused to the agrofood sector
Core activities	- Funding to spin- offs and spin- outs focused to the agrofood sector - Support in business planning, marketing, investment seeking, etc. - Management support
Implementing entity	Region of Central Macedonia or General Secretariat for Research and Technology
Financial resources	Regional Operational Plans or National Research and Technology Programme
Target groups	Talented researchers and technicians
Indicators for implementation success	- Number of spin- offs and spin- outs - Sales and exports of spin- offs and spin- outs - Leveraging of investments

Name of the measure	Enhancing the cooperation of the primary agricultural sector and the manufacturing food sector
Region	*Central Macedonia (Greece)*
Timeframe	Long term (4-7 years)
Rationale	Significant problems exist with regards to the non- availability of raw materials for food production on a national level, e.g. approximately 60% of milk and more than 80% processed and consumed in Greece of meat is imported; this practically means that a lot of potential added-value in the entire food production chain is lost for the country; therefore it is of outmost importance to strengthen the national primary production capacity so that it better serves the national food industry needs and to reinforce the cooperation of primary and secondary food production by means e.g. of the development of contract farming agreements, etc.
Particular sector and subsector	All food sectors, but in particular those that refer to mass production, e.g. cereals, milk, etc.
Objectives	➢ To enhance the cooperation of the primary agricultural sector and the manufacturing food sector ➢ To develop raw materials that are relevant and suitable to the exact needs of the manufacturing food sector ➢ To ensure that agricultural production in absorbed and minimise fluctuations in pricing ➢ To develop raw materials with added market value
Core activities	Support measures to enhance the cooperation of farmers (and their associations) with food companies (and their associations): Consensus building, feasibility studies, negotiations, financial incentives and guarantees: - Contract farming: Contract farming involves agricultural production being carried out on the basis of an agreement between the buyer and farm producers. - Integrated farming: Integrated farming or integrated production is a commonly and broadly used word to explain a more integrated approach to farming as compared to existing monoculture approaches. It refers to agricultural systems that integrate livestock and crop production and may sometimes be known as Integrated Biosystems. - Organic farming: Organic farming is a form of agriculture that relies on techniques such as crop rotation, green manure, compost, and biological pest control.
Implementing entity	Ministry of Agricultural Production and Rural Development
Financial resources	Ministry of Agricultural Production and Rural Development
Target groups	Farmers (and their associations) with food companies (and their associations), support organisations.
Indicators for implementation success	- Number and size of contract farming agreements - Number and output of Integrated farming and Organic farming ventures

Name of the measure	Updating the academic curricula of academic studies to match current agrofood needs
Region	*Central Macedonia (Greece)*
Timeframe	Long term (4-7 years)
Rationale	Agricultural and food production necessitate new skills, techniques and knowledge in order to constantly produce products that are up- to- date with the market and consumer needs. Universities, technical schools, etc. should be able to provide these new skills and provide opportunities for practice in agricultural and food production.
Particular sector and subsector	All food- related sectors
Objectives	➢ To provide skills that match the agricultural and food production needs ➢ To provide graduates with increased opportunities for acquiring relevant jobs in the sector ➢ To support the transformation of the agricultural and food production from a labour- intensive to a knowledge- intensive industry
Core activities	Academics, researchers, industry representatives, innovation experts, consultants, etc. work together, perform a trends and needs analysis towards the development of updated academic curricula on relevant domains such as: - Food technology studies - Biotechnology and genomics - Veterinary and horticultural studies - Chemistry, Physics, Engineering - Management, Marketing, Economics, etc.
Implementing entity	Ministry of Education
Financial resources	National Structural Funds
Target groups	Academics, researchers, industry representatives, innovation experts, consultants, etc. Final beneficiaries of the activities are students.
Indicators for implementation success	- Increase in the employment levels of new graduates from relevant academic departments.

3. REGION OF APULIA

3.1 DESCRIPTION OF THE REGIONAL CURRENT STATE OF PLAY

The agrofood sector represents one of the key economic sector of the Apulia region. The most recent sector studies highlight a situation with several aspects: nevertheless some food products classes have a significant sale rate (with a positive growing trend) many traditional Apulian productions are not included as recognized quality labels, due to an insufficient process and products characterization. Moreover, the typical and traditional products, already known by public, require the upgrading of transformation manufacturing process to increase their competitiveness. Many SMEs are investing their efforts to improve the safety and typical products assurance, to promote the development and the valorization of agro-food sector as entire system, to define the requirements for process and products certification.

The Apulian agrofood industry system in this way is moving towards the creation of food products supply based on specialization as key factor to play in a large competitive market, being guided by market drivers enhancing and adding value to critical factors already existing differently in each chain.

The potential competitive food chains seem to be those having a strong distinctive specificity, such as the traditional chains of wine, olive oil, and vegetables, wheat based products, cereals, dairy products. For these chains the companies may use existing competitive advantages arising from product characteristics (quality, diversification), organization (production and marketing), brand recognition and ability to evoke "Made in Puglia". According to the survey carried on during the INNOFOOD SEE project, Apulian SMEs expressed demand for innovation, mainly unspoken (or latent), oriented to the improvement of the quality of products supply and to productivity increase. Moreover, they shown a deep knowledge and awareness of manufacturing processes and products in order to improve their capacities/or product characteristics, while expressing a minor capability to act really, as well as severely limited low financial resources. The analysis highlighted also the difficulties of regional SMEs to transform their request for improvement in a potential pathway (internal or external) of innovation. Companies in which it was clear what and how perform innovative actions were extremely rare and often when high skilled and specialized human resources worked inside (generally in large enterprises).

The common technological issues and needs concerned mainly the maintenance of quality standards, the higher manufacturing capacity, the food safety, the ability to product diversification to meet the -changing needs of the market and the reduction of energy and water consumption.

In terms of food chains, the Apulian Agrofood sector is particularly advanced, both in terms of the primary agricultural production as well as the food and manufacturing industry. The main agro-food production chains are: Dairy products; wheat and bakery; • meat products; olive oil; grapes and wine; vegetable and fruits (olive, almonds, figs), and livestock (sheep, pigs, cattle and goats).

AGRICULTURE

In comparison with the country as a whole, the economy of Apulia is characterized by a greater emphasis on agriculture and services and a smaller part played by industry. The share of gross value added generated by the agricultural and services sectors in the total gross

value added of the region is in fact above the national average, whereas the share of industry is below.
Agriculture in Apulia is largely modern and intensive, allowing the region to be at the first places in Italy for the production of many products, like “durum wheat” and tomatoes in the Foggia province, besides table grapes and oil, with around 50 millions olive trees. Also important is the production of salad, artichokes, fennel, cabbage, celery. The old primacy for almond production has on the contrary been lost. In specific areas fruit cultivation is also relevant, like peaches and sweet cherries.

FOOD INDUSTRY
The Apulian food industry can count on a large variety of products and a large number of local typical and traditional products that make this manufacturing sector an important reality, having a continuous positive evolution, despite the negative cyclical dynamics that are investing production activities in the Italian country. According to the annually ISTAT studies, in 2007 the sector food industry in Puglia recorded positive production trends. The value added at Basic prices (VA) produced by Regional Food was 1.1 billion euros, equal to about 5% of the total national and 21% of the South one. In the two years considered (2009-2007), the value added showed an increase of 8, 2%, a figure far above than the national one (+2.2%) and South one (+1.2%).
In food products the region has attained a significant degree of competitiveness with foreign producers, even if the competition from emerging countries and the recent financial crisis represent a concrete risk.
In addition to the traditional sectors of wine and oil, also the mill industry and pasta production have a big role in the sector, also being Italian leader in the heavy wheat production (21 % of national total, Istat 2011), while the Apulia is the third Italian region for the pasta production. Significant roles are covered also in the diary industry, coffee and meat transformation (Bank of Italy 2011).
The Apulia Region is playing a relevant role in the “**organic sector**”, following the positive Italian trend of growth. In 2012 the Italian organic firms increased by 3%, reaching 49079 players with an area under cultivation amounted to more than a 1,100 hectares (+6.4%).

The consumption of organic products in Italy in the first four months of 2013, the spending marks a bio + 8.8% compared to the same period last year (Ismea / GFK-Eurisko) and Puglia is one of the best performer, with an increase in the number of organic farms by 20.3%, thanks to the hectares planted with olive trees and vines. This growth surely has been influenced by **investments** in the sector, supported also by specific structural policies Regional and Community for internationalization, trade and industrial processing of agricultural products. In Apulia, concerning the labor employed in the field of agri-food processing, the income from employment has increased (+23%) and gross wages too (+23%) more than in the rest of Italy (Nomisma, 2013).

The occupation is rather stable over time and characterized by a predominant use of staff employees. In the years from 2002 to 2007 units of work that is not occupied showed strong oscillations and in the complex have shown growth for the component employment by about 9%, which results to be higher than that of the South (+3%) and Italy (+5%). In the period considered, independent units, instead, after the considerable decline recorded in 2005, marked a change in total almost irrelevant (+1%) while in the rest of the nation have showed an increase, respectively 5% in the South and of 4% in Italy.

Table 4- Food and beverage industry key statistics in Apulia, (Source, Federalimentare, Year 2009)

Parameter		Unit	Percentage of national total	Share of employment in manufacturing total
Food manufacture	Number of companies	4898	8%	12%
	Number of persons employed	21857	6%	
Beverage manufacture	Number of companies	334	10%	0.6%
	Number of persons employed	1712	4%	

EXPORTS OF AGRICULTURE AND FOOD PRODUCTS

The trend for exports of firms in the South working in the food and drinks are extremely positive. The Apulian food industries reached the sales of **4.8 Billion of Euro in 2011**, representing the **3.8 %** of all the total agrifood sales of Italy. The food exports are continuously growing, having reached in 2010, the 0.5 M euro, representing the 10,4% of total. The increase in exports (in the first nine months of 2010) was of 38.8% for agricultural and 22.6% for food.

In South Italy in June 2011, the beverage exports recorded for about 69 million euros (ISTAT), an increase over the first half of 2010 9 , 9%, while exports to food businesses of the South grew by 4.57%, amounting to over 761 million euros.

In the first three months of 2012 exports of food products Made in Italy grew at a rate of **6 percent** which is equal to more than triple the average of 1, 7 per cent of national exports. These results confirm the positive trend of last year, when the record amount of 30 billion of food products export was registered. In the table below the recent data about key indicators about food and beverage regional industries are indicated, showing that Apulia is the 7th Italian region for sales in this sector, as well as the 9th for the export on a total of 20 regions. This trend has been confirmed in 2013, with growing export rates of agricultural products (+19,7%) and food and beverages (+9%).

RESEARCH AND INNOVATION

The Apulia RTD system is developing according to Italian policies and national trends, trying to create valorisation of local products and boost enterprises innovativeness through product development programs, targeted innovation projects and human capital enforcement .

The **Apulian Agro-food Research System** registers some excellence points in the applied research well known at international level (i.e. mycotoxins, food safety, post-harvest technologies, dairy products technologies) nonetheless difficulties in project deployment with SMEs emerged and low seems to be the financial resources allocated for R&D.

The **regional policies** are playing a strategic role, coherently with the national framework, so facilitating innovation by sustaining the development of the Apulia agro-food sector based on a cluster approach, gathering together all the key players involved (Districts, SMEs, RTDs, Universities, Education and training centres, Associations, consultancy firms, etc..).

In particular, the Apulia Region has been carrying on a global strategy to enforce the integration and to favour the communication and interaction among different players supporting them in a common and unique process of sustainable innovation. In this framework very important has been the Region authority role and the creation of a dedicated Agency, named ARTI, with the institutional function to gather all academic and research players in strict

conjunction with territory and local industries. The Agency represents a natural bridge to facilitate exchange of experiences, becoming also pole favouring the links with SMEs and local or productive initiatives, supporting the economic growth of the agro-food sector.
In addition, the Regional policy has reinforced the technological and productive **districts system**, to strengthen the economic future perspectives, focusing on the promotion of industrial clusters as a powerful way to boost local development and competitiveness. In the agro-food sector the Region recognized 2 agro-food productive districts (The Agro-food District of Food Quality "Terre Federiciane", operating in Bari and Foggia areas with 683 partners; the Agrofood District of Food Quality "Jonico-Salentino", operating in Lecce, Brindisi and Taranto areas with 187partners)and 2 technological ones (Agro-food, Biotech).
26 networks of research labs have been granted by Apulia Region to provide services to local companies by using advanced equipments, integrated methodologies and technologies and promoting joint projects, according to a massive approach.
In the past **5 years** other many **big projects** proposed by Apulian RTD entities jointly with SMEs have been awarded under the National Operating Program Research and Competitiveness 2007-2013 (NOP) for more than **40 million €**. The purpose of the Operating Programs is to promote the competitiveness of the economic system of these regions, and improve the scientific, technological and economical position of the whole country in the international context. According to a **cluster** approach, the main agro-food chains present in Apulia (diary products; wheat and bakery; meat products; olive oil; grapes and wine) were included in the NOP awarded projects together with specific training programmes entitled to create high specialised profiles in the research sectors related to agro-food and to life-sciences in general.
In addition, several measures have been managed by Apulia Region to sustain innovation and addressing the food industry, officialy defined as one of the main strategic sector of Regional interest for economic development. Consequently, all the measures addressing RTD and innovation are directed also to food and agrofood system, due to its relevance in the regional scenario.

Investments in Research for SMES -The Apulia Region supports investments by Apulian SMEs addressed to develop research and technological progress based on industrial research and pre-competitive development. The maximum financial contribution is 1M euro for industrial research, 799k euro for pre-competitive development, 300k euro for technical feasibility studies, 200k euro for patents. Agro-food SMEs investments represent 9% of total.

Operational innovative enterprises - The measure aims to support the growth of existing innovative operating micro and small enterprises who wish improve their competitiveness through the application of research results in the main strategic industrial sectors of Apulia (agro-food included). In particular the measure supports the investment projects enhancing the results of previous research. Public funding: 7ML Euro. Agro-food SMEs investments represent 5% of total.

Network of public research laboratories Creating and enforcing the research system in supplying innovation and technologies to facilitate and support needs and requirements by SMEs. The objective is to give Apulia a strong technological infrastructure with a breakdown structure of local points, distributed in a reticular way in all the region according to a very high level of technological specialization for SMEs innovation.

Supporting new innovative SMEs

The Apulian agro-food research system is mainly made of public entities, very few are the private RTDs active in the considered field. The profiling analysis reveal that Apulian RTDs system is at the same time internationally linked from an academic and project activity points of view and territorially embedded with knowledge services offered to third parties also at local level.

The profiled Apulian Agro-food RTDs registered **45** patents in the past 5 years. The National Institute for Nanotechnology (CNR-Nano) based in Lecce accounts for more than 50% of the patents total amount. Even tough not always directly related to it, the high number of **nanotechnologies patents** in the Apulia Region constitutes a critical mass of knowledge in a sector considered high potentially important for the improvement of the agro-food sector. The presence of an important nanotechnology scientific and academic hub at regional level[3], could represents a potential ***smart ability*** for the Apulian territory as a whole and an important *key point* also for the agro-food sector (**cross clustering**).

The **Institute of Science of Food Production** (CNR-Ispa) registered 10 patents in the considered period (15 including the year 2006) followed by **CNR-Issia** with 6 registered patents. As easily predictable the Institute of Science of Food Production patents are the most significant for the agro-food sector, less predictable is the fact that those findings are really relevant for the Apulian territory, giving tools and methodologies to improve the food safety of cereals (important commodity in the local economy) and also input to develop new "functional" foods by processing typical products, such as olives and artichokes (innovation based on analytic knowledge). Those links represent an example of territorially **embedded regional innovation** with R&D institute providing target innovation support aligned to the needs of local industry.

8 spin-off companies created in last 5 years correspond to 19% of profiled RTDs. The Polytechnic University of Bari accounts for 50% of the spin-off registered including only one spin-off really operating in agro-food sector, followed by Department of Agro-Environment and Territorial science of Bari University with 2 spin-off companies.

[3] CNR-Nano Institute in Lecce, CNR Institute of Photonics and Nanotechnologies in Bari, University research and degrees in the biotech and nanotech sector.

3.2 KEY POINTS FROM THE SWOT/ SOR ANALYSIS AND POLICY RECOMMENDATIONS REPORT

The empiric analysis - from the survey/profiling of SMEs and RTD players to the SWOT/SOR analysis with stakeholders - has highlighted some key points useful to plan and propose a set of recommendation for the formulation of policies, programmes and measures able to sustain innovation in Apulia Region..

First of all, it should be declared that the Apulia Region as institution is strongly committed in the innovation process, sustaining the strategic economic sectors by funding technology, research and innovation based actions. This political commitment is clearly appreciated by research entities and by SMEs, even if SMEs sometime claim for more funding. This commitment represents an opportunity for the agrifood growth and generally the public intervention is considered a fundamental point to face the economic crisis. Innovation and research are also considered as important assets to strengthen competitiveness and globalization challenges.

From the political point of view, we can observe that the Apulian policy has been addressing innovation by reinforcing "system interventions", to be intended as a series of integrated measures aiming at promotion district models, clusters, networking, synergies between industries and R&D performers. This is the way to sustain local development and competitiveness. First of all, the agrifood sector has been recognised as strategic sector for the entire regional economy, thus allowing its inclusion in all regional economic policies. Moreover, 2 agri-food productive districts (involving 870 partners and 2 technological ones (Agri-food, Biotech) represent a mean to put into action these efforts.
Thus, recent strategic policy documents (i.e. "**Guidelines for research and experimentation in agriculture 2012-2014"** issued by Regional Agrifood Resources Department) are focused on the consolidation of links and connections between agrifood Apulian enterprises and scientific research system and knowledge promotion, in order to create an integrated system including research, testing, demonstration and innovation transfer process as a competitive key factor for economic development of agrifood productive chains. Three main programs let this policy operative: the Operational Program PO 2007-2013, the Apulian Rural Development Programme (PSR) 2007-2013; Apulia Region Framework Programme Agreement.

Although these policies, considering a preliminary assessment of the Innovation Framework Conditions, the region of Apulia is positioned under the average levels considering its indicators at national and EU level. The following indicators show a different situation:
i) Public investment in knowledge: Total R&D expenditure (GERD) for Apulian Region was 0.8% of GDP in line with the Italian South regions average at 0.9% and below the national score. R&D expenditure in Italy is 1.26 of total national GDP (2009, Eurostat). Business enterprise sector accounts for more than 50% of total GERD. EU average for the same years was up to 2% with businesses contribute to R&D going around 1.23 % of GDP. OECD average was 2.27% of GDP. Apulia Region shows investment in research and development scoring 3 times less than that of EU average and this may probably have a negative effect in knowledge production. Unfortunately no breakdown of the GERD to food RTD is available.
Human resources in science and technology (HRST) in Apulia represents 26.3 percentage of active population (Eurostat, 2012)
ii) Relevance and Quality of research: a number of key statistical information taken from the SJR & Country Rank is used to provide some quantified and verifiable information about this topic in Italy, and Apulian situation could be assimilated to.

The Italian R&D resources significantly lag behind those of other major economies, its output, in terms of scientific publications, is one of the most prolific in the world, and highly recognized in several fields. In recent years, Italy's annual R&D spending, has scored low, compared with the European Union average. With 48%, the public sector is a large contributor to R&D funding, with private sector only recently leading–an uncommon occurrence in major world economies.

From an empirical point of view, the SWOT analysis realized in 2012/2013 during this project, through the participation of stakeholders, researchers and SMEs, highlighted some relevant points:

- **Strong asset** represented by existing research entities in the region
- Significance and distinctiveness of **food production** with emerging competitive food companies, characterized by market- oriented approach, export capability, good market position, brand identity and products with strong or high quality
- **Business dynamism** by Medium enterprises, flexibility and potential innovation leanings, to be intended as attention at integrating new technological knowledge into existing organization and potential orientation towards innovation
- **Small size** of Small and micro enterprises , with actual low inclination towards technology/innovation and low ability to apply research results
- **Human capital weakness** in Small and micro enterprises in terms of high skills availability, research and management low capability, job insecurity (temporary work), low perspective for permanent employment
- **Networking** not completely developed between SMEs and RTD entities
- RTD entities and players are innovation-oriented with strong **institutional commitment**
- **Regional Funding measures** are addressing promotion and/or enforcing research infrastructures
- **High** level of **bureaucracy**
- **Request for innovation** in the agrifood, particularly expressed at international level (especially with regard to safety) and emerging foodstuffs questions
- **Opportunities to create infrastructures** supporting the system, also by networks of laboratories, common and relevant **graduate courses**
- **Possibility to direct the Apulian agrifood sector versus strategic models**, enhancing competitive levers – internationalization.

It should be highlighted that the average dimension of Apulian agrofood enterprises is quite small or micro, and this factor represents a concrete difficulty to face innovation, even if the small dimension is consider a flexibility factor. Some points above illustrated seem to be in contradiction, but they are two faces of the same aspect.

Considering the overall results, it seems important push the food industry towards innovative - market driven technologies in order to respond to the real demand in the region, but also to facilitate contacts between industry and the research world.

The Apulian agrifood companies are potentially oriented to and attracted by innovation, indicating a sort of business dynamism and attention at integrating new technological knowledge into existing organization.

The conclusion that can be drawn from the analysis is the presence of a **strong set of research** in Apulia on one side and **emerging food companies** oriented to markets abroad, with good market position and products with a strong quality brand identity.

The SOR analysis subsequently pointed out the matching between strong and weakness points vs opportunities and threats. The main conclusions arising from this exercise are rather optimistic, whereas the suggested emerging strategies toward innovation both by SMEs and RTD analysis are "**attack strategies**", showing a basic power of the Apulian agrifood sector, able to face up the challenges coming from economic crisis, change of consumer trends, globalization, by filling the gap with other economic systems, seizing opportunities and enforcing its strengths. Below the main actions for strategies implementation are listed:

- the **good market position** may allow SMEs to seize opportunities represented by a strong product identity, at regional and/or national level and by a positive and increasing **exports** trend.
- these favorable elements are strengthen by the SMEs ability to produce high **quality products** by implementation of effective operational processes.
- the adoption of **innovative technologies** by SMEs together with the presence of high experienced human resources, can help to seize another good opportunity represented by ongoing and future **RTD and innovation programs** addressing the sector.
- the **cooperation** between **SMEs and the research public or private system** seems quite developed, even if efforts should be made to make this cooperation effective and valuable, able to create a real structural and targeted network, with the aim to enlarge cooperation and relationships it in this sector. These collaborations have been usually asked or pushed by researchers, who need **business partners** to develop and complete their research projects, while many companies need actually to be guided to develop own knowledge of potential public financing measures. The enforcement of this cooperation could allow **RTD** entities **to address research** and strengthen their position, giving value to the high-potential human capital. In the same time this union could allow and guide **SMEs to reinforce internal skills and competencies**, supporting them in the accession to funding programs able to sustain innovation and enforce or improve the existing processes and products.
- At the same way, it seems important **push the food industry** towards innovative - market driven technologies in order to respond to the real demand in the region, but also to facilitate contacts between industry and the research world.

This strategy could be also supported by setting **new incentives** for those researchers committed into cooperation between SMEs and RTD entities on innovative and application themes, thus overcoming the strong gap with basic research. In fact, the basic research, even if considered a strength, really limits the possibility to participate at those funding programs considered attractive by industries and SMEs.

On the SMEs side, interventions should be made to address some problems that don't favour the innovation streaming. The **absence** of operating/organization **units dedicated to research** and development represents the main factor preventing SMEs to take the opportunity of participation at programs of RTD and innovation and to use the reduced funds.

These challenges are compounded also by:

- SMEs inability to create network with EPR and private individuals,
- high costs to manage a patent process or for patents acquisition,
- Bureaucracy / regulatory barriers and lack of time on the part of firms.

The problem represented by **long bureaucratic processes**, that could keep far companies from funding application or requests, should be taken into consideration, representing a real obstacle to innovation process or simply for its accession.

In conclusion, the main pillar to develop a **regional strategy for innovation** is represented by ***enhancing the existing path***, founded on *a* ***strict cooperation*** and collaboration between ***public and private*** sector*.* This objective could be achieved also by improving an open exchange of experiences in R&D and by consolidating existing **networks**. All these factors are being also favoured by the opportunity of **new R&D EU and regional programmes** and availability of **high-skilled personnel**.

Both SMEs and RTDs players are oriented towards innovation, key factor to be competitive on global markets. The **strategy** to support innovation in the region should be *to improve and strengthen the ongoing path of "**guided" networking and cooperation** in innovation projects pushed by Regional programs.*

This union could allow **RTD entities** to address research and strengthen their position, giving value to the high-potential human capital. In the same time this union could allow and guide **SMEs** to reinforce internal skills and competencies, supporting them in the accession to funding programs able to sustain innovation and enforce or improve the existing processes and products.

In the table below, some proposal for adopting key measures are listed:

Key measures proposed

Problems to be addressed	
Public-private cooperation	*1. Strengthening public-private cooperation*
Innovation culture	*2. Improving awareness and knowledge on innovation and competitiveness*
Low innovation streaming	*3. Bridging knowledge from R&D system to SMEs*
gap with basic research	*4. New incentives for researchers for cooperation with SMEs*
Traditional academic curricula	*5. Updating of academic curricula to match current food innovation trends*
Innovation management in SMEs	*6. Improving skills for innovation management in SMEs*
Innovation capability of SMEs	*7. Favoring the creation of R&D department in SMEs*
Low patents applications	*8. Funding SMES for adopting innovative technologies, also by patent applications*
High bureaucracy	*9. Bureaucracy simplification (times and rules) and more efficient project administration*

3.3 DESCRIPTION OF KEY MEASURES

These recommendations arose from the results of SWOT analysis and SOR and have been thought to be realistically adopted in the local or national context.

Name of the measure	Strengthening public-private cooperation
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The cooperation between SMES and the public or private research system is being developed in Apulia Region, by creating a network of labs involving private sectors and food SMEs. The regional project "Networks for enhancing the potential of regional technology" aimed at upgrading infrastructure of laboratories and public research centers in Apulia, addressing regional productive sectors considered as points of reference for the diffusion of technological innovation. The aim of the project was to create high-technological based "nodes" distributed in different areas, integrated and equipped with advanced instruments, knowledge and skills "frontier" accessible and usable by the regional productive system for relocation of traditional industries and the development of innovative strategic sectors.* *The next step is to drive these efforts to make the cooperation more effective and valuable, in order to create a real and structured network, with measurable and reachable objectives, able to stream into the sector by active and massive participation by different players.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to integrate the Apulian private-public laboratories network with new services able to support the enhancement and promotion of these assets with sustainable initiatives and demonstration activities involving SMEs* ➢ *to make operative and structured the network and create an active context in which players share objectives with definite goals* ➢ *to avoid temporary actions or networking dedicated to single or few projects* ➢ *to realize a structured guided system for innovation with a strong commitment of research and industries in joint projects.*
Core activities	*Provision of innovation support services (advisory, innovation management, technology transfer and training);* *to network members on innovation processes and technology transfer, planning of common paths and develop national and international innovation projects, with attention to collaboration along food chains, also by joint presentation of proposals, assistance during the implementation of projects, transfer and exploitation of research results, network promotion activities.*
Implementing entity	*Region or Regional Agency*
Financial resources	*The funding could be included in the next PON R&C with coverage from*

	the ERDF- Rotation fund.
Target groups	*Food SMEs, research entities, consumer associations, special target groups, regional authorities, investors, consultants, media, etc.*
Indicators for implementation success	*- No. of services requested and used by networks participants* *No. of new joint proposals presented* *No. of intervention plans for innovation presented by networks participants* *No. of promotional events realized.*

Name of the measure	***Improving awareness and knowledge on innovation and competitiveness***
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The need to enlarge and consolidate existing regional networks orientated towards integration between research and industry comes out from the good signals from recent experience carried out by ARTI by funding several labs networks. At the moment a hard basis of capability has been created, through the acquisition of new plants, technology systems, devices and instruments, and it is necessary to put into force these new assets by supporting a parallel growth of personnel in terms of soft skills to share knowledge and work constantly with SMEs. Operational plans to stimulate networking towards innovation and competitiveness are needed to make this process operative and concrete.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to improve technological ability to innovate at local level* ➢ *to create and stimulate the innovation culture and behaviour in SMEs and RTD entities*
Core activities	*Provision of training services to acquire skills and tools to improve innovation processes, project management, technology transfer, creation of a web platform to exchange contents, experiences, sharing projects and skills; provision of direct information to access forms of public funding aimed at encouraging innovation processes, opportunity to participate in regional, national and international prizes for innovation, also through social network and communities.*
Implementing entity	*Region or Regional Agency*
Financial resources	*The funding could be included in the next PON R&C with coverage from the ERDF- Rotation fund.*
Target groups	*Researchers, technicians, entrepreneurs, technology consultants*
Indicators for implementation success	*No. of funded services according to an intervention plan for innovation presented by networks participants* *No. of participants at training sessions*

Name of the measure	*Bridging knowledge from R&D system to SMEs*
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The existing professional assets of high skills in research could represent a real resource for agrifood system in Apulia, to strengthen SMEs and support their innovation processes, but this assets seems to be confined to the research environment and framework, with evident difficulties to transmit advances in research useful for industry.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *To create and strengthen links between researchers and SMEs* ➢ *to generate a model of "research for the competitiveness"* ➢ *to generate a kind of innovation with a clear definition: the transfer of new ideas to market with the right profit for all stakeholders (from those who have and use the idea, to whom transform it into product and distribute it on the market).*
Core activities	*The main activity should be represented by actions of technology transfer (TT) that should flush where innovative ideas are generated and identify areas and industrial enterprises with a real perspective to turn them into new and successful products to be launched on the markets.* *These actions should be carried out by TT professionals (existing or to be formed or trained), result oriented, able to capture the essence of the scientific idea, project it in one or more "business" with all their dangers and their opportunities and, finally, able to find also entrepreneurs (existing or to be formed) and help them, as long as needed, for the launch of the new adventure.*
Implementing entity	*Region or Regional Agency*
Financial resources	*No funding could be necessary, this policy could be supported by ordinary funds or included into ongoing projects*
Target groups	*Food SMEs, research entities, regional authorities, consultants.*
Indicators for implementation success	*No. of TT actions* *No of TT experts.*

Name of the measure	*New incentives for researchers for cooperation with SMEs*
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The creation of incentives for researchers should be addressed to engage scientists in collaboration between research institutions and enterprises on innovative and practical themes and area, in order to overcome the gap with basic research. The basic research, despite being considered a strength, in fact seems to limit the possibility of access to programs interesting for industries.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to stimulate research cooperation between research entities and SME* ➢ *funding public researchers to realize Industrial research and pre-competitive research.*
Core activities	*Funding actions, giving incentives (bonus) directly to those researchers able to obtain tangible results by integrated research with SMEs.* *Actually in Italy Beneficiaries eligible for financial assistance from the FAR are: Industrial enterprises producing goods and/or services, Transport companies, artisan enterprises, Consortia and consortium companies (limited access), Science and technology parks.*
Implementing entity	*Ministry of Education, Universities and Research (MIUR)*
Financial resources	*1% of FAR annual fund - Research facilitation fund - The policy should be included in the next PNR - National Research Programme (PNR), which defines the objectives and models for implementation of specific interventions in priority areas, disciplinary sectors, involved parties, projects.*
Target groups	*Food SMEs, researchers*
Indicators for implementation success	*No. of incentives applied and received by researchers;* *No. of formal cooperation agreements signed between SMEs and researchers*

Name of the measure	***Updating academic curricula to match current food innovation trends***
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The analysis on Apulian academic curricula showed the need to include new topics, in order to transfer advanced knowledge on emerging research themes in the field of biotechnology, food processing, food safety and security, health aspects, management and innovation, research policies. All these topics should be complementary to basic disciplines.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to update academic curricula by including new emerging topics relevant to food innovation, according to a multidisciplinary approach* ➢ *to update skills useful for innovation management.*
Core activities	*Core activities will be represented by the proposal for new contents to be added as a basis set of food innovation topics, and to be approved by University, Education and Research Ministry, including management, emerging technologies and demand-side.*
Implementing entity	*MIUR (at strategic level) and Universities (in terms of implementation, according to their own independence to define curricula)*
Financial resources	*Ordinary funds for University*
Target groups	*Universities*
Indicators for implementation success	*No. of new topics included in academic curricula*

Name of the measure	*Improving skills for innovation management in SMEs*
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The current collaborations between R&D entities and SMES have been usually asked or pushed by researchers, who need business partners to develop and complete their research projects. Many companies need to be guided to develop own knowledge on potential access to innovation, represented by public financing opportunities and measures.* *The need for SMEs to improve their competencies and knowledge is driven by the lack or insufficient skills on main innovation topics: innovation management, development of internal research projects in cooperation with institutions or research organizations, proposal preparation, project management, networking and communication, ICT and emerging technologies, smart specialisation and EU policies and strategies for innovation, funding opportunities.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to improve skills in SMEs by supporting the growth of innovation capability trough training on the job* ➢ *creation of a network of SMEs innovators.*
Core activities	*The main activity of this policy could be represented by specific and compulsory training actions to enhance skills related to organisational performance, innovation capability, reactivity to market changes and business competitiveness.* *In addition, the skilled people should take part to the EUWIN initiative, to share experience and participate at an international policy, being stimulated to apply innovation into their SMEs.*
Implementing entity	*MIUR, Industries associations, Labour Ministry and Fondimpresa*
Financial resources	*The funding could be supported by Fondimpresa (the most important inter-fund for continuing training in industries in Italy). 50 % of current Fund to be addressed to innovation training . (Companies adhering at Fondimpresa monthly pay per employee a contribution of 0.30% devoted exclusively to training Fund).*
Target groups	*Food SMEs*
Indicators for implementation success	*No. of employed trained;* *No of registrations at EUWIN;* *No. of participations at EUWIN initiatives.*

Name of the measure	*Favoring the creation of R&D department in SMEs*
Region	*Apulia (Italy)*
Timeframe	Medium Term (2- 5 years)
Rationale	*One big problem emerging from studies and analysis on Apulian agrifood sector is represented by the small dimension of the most part of SMEs, that really constitutes an obstacle or difficulty to the development of internal operating unit dedicated to research and development at company level.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to provide innovation support services (advisory, contultancy for innovation management, technology transfer and training)* ➢ *to enforce the capability of SMEs to address innovation through a direct commitment towards research and innovation* ➢ *to favour link and communication by a simpler and direct interface with research entities and institutions.*
Core activities	*Fundings or fiscal incentives for investment in R&D structures (laboratories) in SMEs.* *Fundings for the creation of shared centers (laboratories) able to sustain several or common requests by companies of a certain food chain for advanced technological services.*
Implementing entity	*Ministry for Economic Development*.
Financial resources	*Using FIT (Found for Technology Innovation)*
Target groups	*Food SMEs and their associations and/or districts.*
Indicators for implementation success	*No. of realized investments* *No of R&D depts.* *No of realized labs*

Name of the measure	***Funding SMES for adopting innovative technologies, also by patent applications***
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*SMEs should be encouraged to adopt innovative technologies by a guided participation to calls to receive funding for the implementation of technologies. In Apulia a small number of patents in agrifood sector are recorded; the region shows a big potential to improve this position, also taking advantage from the relevance of the agrifood sector at economic level and from the availability of advanced research skills.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *Funding innovative industries (grants, loans, guarantees, equity, etc.);* ➢ *To favour patents adoption* ➢ *To enforce connection between SMEs and RTD entities*
Core activities	*The policy should address directly SMEs to facilitate the financing of innovative projects based on the industrial exploitation of titles of industrial property (patents, drawings and models). It should be extended also to funding the preliminary phases leading to the industrial property, as incentive to apply research to discover/improve new methodologies or create new processes and/or products, thus increasing the number of patents.*
Implementing entity	*Ministry of Economic Development*
Financial resources	*20/30% of National Fund for Innovation (FNI) to be assigned to patent applications*
Target groups	*Food SMEs, research entities, investors*
Indicators for implementation success	*No. patents required;* *No of outputs achieved by innovative processes.*

Name of the measure	***Bureaucracy simplification (times and rules) and more efficient project administration***
Region	*Apulia (Italy)*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The bureaucracy complexity represents an obstacle to the access to public funds and a criticity during the implementation of a funded project. This is claimed by the majority of SMEs involved in the INNOFOOD SEE profiling survey, as well as recognized as problem by the Research side. Selection, admission, implementation, monitoring and final verification times for a proposal are too long and quite difficult to support an innovation initiative, that naturally requires rapid cycles for implementation and short duration.* *Too many and severe regulations sometimes don't fit with SMEs needs to dedicate a fair time and effort to administration.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to reduce the bureaucracy complexity in funding access and management.* ➢ *to stimulate towards simplification all bodies preparing or managing consistent funded programmes addressed to research and innovation* ➢ *to facilitate SMEs access at funded programs (at EU, National and Regional level), also by training employees and researchers on administration and bureaucracy*
Core activities	*The measure will develop new simplified rules to be applied in this field, with particular attention to more accessible and sustainable financial requirements for grants, means of verification and documentation needed as proof of implementation of projects.* *Specific training on administrative procedures and bureaucracy and funding rule, addressed to SMEs employees and researchers, in order to have skilled personnel.*
Implementing entity	*EU COMMISSION; MIUR, Ministry for Economic Development, body in charge of planning, implementation and management of Funding Programme (i.e. for PON is MIUR - Ministry of Education, Universities and Research), Regional Authority or Department.*
Financial resources	*No funding necessary.*
Target groups	*Food SMEs, research entities, regional authorities, EU programs authorities*
Indicators for implementation success	*No of new rules for administrative and financial simplification* *% reduction of expeted time per administration process.*

Name of the measure	***Promoting a demand-driven knowledge transfer approach for Mediterranean Food Products***
Region	*Apulia (Italy)*
Timeframe	Medium Term (2- 5 years)
Rationale	*A great number of knowledge transfer initiatives have failed to fulfil the objectives that the transfer officers had chosen as their targets. In a great many cases they followed a technology push approach, offering RTD services and technologies that promise impact but do not correspond to needs of entrepreneurs or larger companies. It is also extremely difficult to identify and match technology offers from different universities, failing to build critical mass without overwhelming obstacles.* *The INNO-FOOD SEE consortium has the opportunity to build critical mass in technologies related to Mediterranean food processing, make best use of experts from each region, significantly lower barriers to technology uptake and most importantly make technology transfer entirely demand driven rather than research pushed.* *The objective does not plan a whole scale reorganisation of technology transfer. This measure intends to make best use of all programmes currently operating and bring the strength of the consortium to deliver the best technologies to commercial development.*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *To create demand-driven technology scouting, maturation, matchmaking and transfer for the INNO-FOOD SEE consortium in order to exploit Mediterranean food processing opportunities.*
Core activities	➢ *Directory of demand from sector actors and current technology offers from the consortium. The Partners will compile a directory of technology supply and demand, including: EEN technology offers and Technology requirements from SWOT interviewed regional actors.* ➢ *Understanding demand driven process and barriers in current system. In each region at least 5 entrepreneurs will be interviewed. Through the interviews with the entrepreneurs each partner analyses the future market opportunities and threats of each company. Product, service or process concepts are sketched that enable the entrepreneurs to capitalise on opportunities and ward off threats. The entrepreneurs will deliver for each product concept a set of requirements which they themselves feel that they must fulfil in order to ward off the threats and turn the opportunities into successful new PMCs. The analysis includes requirements such as RTD efforts, marketing, collaboration with either partners, suppliers or buyers and funding.* ➢ *Defining a demand driven technology transfer programme for the consortium. The partners will define a programme that includes: 1) Pooling of technology offers from all research*

	organisations within the consortium; 2) Matchmaking of technologies to build added value to commercial development; 3) Technology scouting across the consortium by experts from different regions and addition of new offers to the central pool; 4) Best practice in commercialisation awareness training for researchers and technology transfer specialists; 5) Mechanisms to bring technology offers and SMEs together – technology fairs, etc.
Implementing entity	*Region and Industries Associations*
Financial resources	*No funding could be necessary, this policy could be included into ongoing projects*
Target groups	*Food SMEs, Research entities.*
Indicators for implementation success	*No. of Directories of technology supply and demand* *No. of Analysis of demand driven approach to technology generation and offer* *No. of Technology and knowledge transfer programmes*

4. REGION OF PAZARDZHIK

4.1 DESCRIPTION OF THE REGIONAL CURRENT STATE OF PLAY

The agricultural sector being of major significance for Pazardzhik region due to the favourable natural conditions and traditions in this sector, food production holds the second largest share of industrial companies registered in the region (16.36% in 2010). The largest number of these are enterprises producing bread and other food products - 98, followed by enterprises producing beverages - 27, and processing and preserving fruit and vegetables – 18. In terms of revenues of the enterprises the food industry has a leading position with 16.50% of the revenues of all industrial enterprises in the region (2010). However, in terms of share of the regional gross industrial production, GDP, income and employment in industry, the sector is only of modest significance. The food industry is highly dependent on agriculture as a major source of raw materials. Basic agricultural trends in the region involve the production of a variety of cereals, vegetables and potatoes, vine growing, oil-supply crops and orchards for which the region features favourable climatic and soil conditions. Animal breeding has been an important strand for the mountain areas of the region as well. However, in spite of the fact that the food industry has recently shown some visible progress towards achieving European standards and renovation of production facilities (all meet HACCP requirements and approx. 50% introduced ISO9001), agriculture has not been developing towards these goals in the same pace and the rate of modernization is much slower, thus failing to keep up to the increased demand for high-quality raw materials of the food producers.

The results of the Technology Audits carried out within the framework of the current project among regional food enterprises indicate that most of the food SMEs are fairly open to innovations - references to innovation are made in the company's mission or vision for 60% of the SMEs. According to food SMEs' own opinion the main source of innovation is the new process equipment in which 70% of the food SMEs have invested. About 46% of the food SMEs organize their innovation activities externally. The companies in the food Industry report they have adopted in the last 5 years advanced systems, new technologies and processes for product diversification, and increased the production range with new and by-products. In addition to offering new products many other marketing approaches have been adopted as well, especially media advertising, social networking, making comfortable and ecological packaging, branding, improving distribution channels, issuing of recipes, etc. During the past five years, 58% of the SMEs report to have been involved in some type of innovation and technology projects. The innovation projects address almost equally new technologies and new products. The objectives which companies are willing to set in an eventual innovation project are product quality, production efficiency, packaging, process quality and safety, and only 4% are considering new products. Major obstacles to participation in innovation projects

indicated by food companies are the lacking information about the availability of such projects, long time for approval and for implementation of projects, insufficient resources (time, funds, technical and personnel capacity), lack of external funding and partners, as well as the reduced consumption as a result of the financial crisis.

Only a low number of food SMEs report to have their own internal R&D department (28%) while almost all (92%) organize internally their innovation activities. Only 46% of the SMEs report to organize their innovation activities externally most of them (38%) cooperating with companies in the sector and only few working with research centres/universities and consultancy companies (6% and 2%, respectively). Only 10% of the SMEs indicate that their resources allocated to R&D amount to 5% of the annual turnover in the last year, most of them using their internal resources.

On the other hand in the region of Pazardzhik there are no universities or research centres. However, the largest number of universities and research institutes specialized both in the area of agriculture and specifically in the food sector are concentrated in the nearby city of Plovdiv (35 km). The University of Food Technologies is a separate institution from the Agricultural University, and the research institutes in this field are mostly concentrated on studies related to agricultural technologies and not specifically on food technologies. Research in the agri-food sector is predominantly carried out within the units of the national Agricultural Academy through participation in national projects while international initiatives are quite unevenly distributed among the different organizations. Equipment in most of the universities and research institutes is out-of-date and modern devices such as NMR, LC-MS, RT-PCR, DNA sequencer, etc. are rarely to be found. The prevailing patents were acquired before 2000 and the reported later ones refer mainly to new plant cultivars and animal breeds. Actually, the results from fundamental basic research (such as scientific publication) far outreach the results of applied research, such as patents, licenses, spin-off, etc. Spin-offs are not to be found anywhere and few RTD entities manage to generate additional income through commercializing products, providing services or expert advice. Contacts between business and science in many cases are informal and hidden while being either ineffective or not at all institutionalized. A specific form of entrepreneurship popular among universities is the establishment of unincorporated partnerships, set up under the Law on Obligations and Contracts mostly for R&D, education and training but these only in isolated cases directly commercialize R&D results. In general, there is lack of enterprise initiative among scientists, researchers and the management of R&D and academic institutions. The economic crisis had a considerable negative effect on the number of personnel engaged in R&D and latest data (2010) show a decline in the number of staff engaged in R&D while the ageing of R&D personnel continues. The prevailing numbers of RTD entities consider that their strengths lie in

the highly qualified staff, and their disadvantages – in the limited funding for research and poor links between the researchers and industry.

In terms of governance the research system in Bulgaria is centralized and policy-making and policy implementation are divided between various ministries and different governmental agencies reporting to the ministries at national level. The executive body for innovation policy implementation plays a variety of roles and implements innovation together with research or entrepreneurship measures as several ministries are adopting innovation agendas. As a consequence more coordination is needed since innovation governance provides a relevant role for these ministries other than the main one or two coordinating ministry(ies). The participation of the private sector and civil society in the policy-making process is through their involvement in different consultative bodies and is notably limited in most of them. Government representatives usually hold the majority of votes in decision-making. On the other hand, in terms of legal framework research priorities are formulated in a number of different strategic documents, e.g. *National Strategy for Scientific Research for the Period 2005-2013*, *National Strategy for Scientific Research for the Period 2009-2019*, *National Innovation Strategy*, *National Reform Programme 2007–2009*, *National Strategic Reference Framework 2007-2013,* etc. However, no new innovation policy support measures have been launched in the country between 2009 and 2011. Additionally, no clear distinction of responsibilities between R&D and innovation policies is made and they remain strongly intertwined which can lead to R&D being given priority over innovation. On the other hand, limited policy attention is displayed towards demand-side innovation so that the innovation policy debate is still strongly geared towards the supply-side. While the subject has only recently started to be considered in certain policy circles and examples of demand-side initiatives from other domains (such as environment or economic policy) exist, the demand-side is not a key focus of innovation policy and the policy focus is rather on fostering business innovation activities and linking academic and industrial research.

A large number of regulations affect innovation activities in the country but often, the impact of regulation on innovation is implicit rather than explicit, setting general framework conditions for businesses to operate. The bulk of regulation activities impinging upon innovation are carried out outside the realm of innovation policy and is technology and industry specific. For instance, on a national scale there are examples of regulations used to promote the uptake of existing products such as in the field of e-services, payment methods, e-government but innovation was not the intended purpose. Specific priorities related to food innovation are formulated in the National Strategic Plan for Rural Development and National Strategic Plan for Fisheries and Aquaculture. These also envisage public funding which is the primary means of financing the centralised research system. EU financing of research and innovation has been increasing its importance in Bulgaria being dispensed more specifically through Operational Programmes

under the National Strategic Reference Framework 2007-2013. EU funds have become the primary source of finance for R&D and innovation during the crisis. In fact, R&D financing from abroad has compensated for the decline in national public and private funding of R&D. Financial flows from the state budget are allocated for direct subsidies to the budgets of public research performing organisations but also the National Science Fund and the National Innovation Fund are the main funding bodies for public research based on the competitive project selection principle. However,t no funding was allocated to the National Innovation Fund in 2009 and 2010.(GBAORD 2009 117,82 (million €) down to 99,713 in 2010)[4]. The distribution of research and innovation policy funding grants amongst policy priorities in 2010 gave priority to research infrastructure and R&D cooperation and some to stimulation of PhDs and to management innovation and advisory services (Based on the ERAWATCH-TrendChart database). At regional level research related initiatives can be found in three types of documents relevant to regional policy – the Regional Plans for Development, the Regional Innovation Strategy of South –Central planning region (strategic documents at NUTS II level) and the Regional Development Strategy 2005-2015 for District of Pazardzhik (strategic document at NUTS III level). However, no mechanisms at regional or national level support their actual implementation and no authority is given to regional administrations in the distribution of EU funds on which these documents primarily rely for financing their priority measures.

Bulgaria's research policy can be described as generic with no specific thematic focus. Although policy documents outline visions and contain specific thematic areas, the available financing is scarce and cannot cover all proposed actions. Measures in support of food innovation which are implemented or have been implemented in the region of Pazardzhik comprise three priority axes of two national Operational programmes: the Rural Areas Development Programme and the Development of the Competitiveness of the Bulgarian Economy (“Improving the competitiveness of the agricultural and forestry sectors” and “LEADER”, and “Development of knowledge based economy and innovation activities”, respectively). Main categories of research and innovation measures undertaken were promotion and sustaining the creation and growth of innovative enterprises; research and technologies, and human resources (education and skills). However, according to a recent study Bulgaria shows both strengths and weaknesses in the same fields: strengths in human resource, intellectual property rights and economic effects innovations, and weaknesses in funding and support for innovations, networking and entrepreneurship, intellectual property and innovation results. This implies that the innovation system in the country is generally unbalanced.

4 . http://ec.europa.eu/enterprise/policies/innovation/facts-figures-analysis/files/innovation-funding-trends-2011_en.pdf

Future policies, strategies and plans at national and regional level include the National Strategy for Research Development 2020, the National Strategy for Scientific Research for the Period 2009-2019, the National Reform Programme of the Republic of Bulgaria 2011-2015, the National R&D goal in the framework of Europe 2020 strategy, the National Roadmap for Research Infrastructures and the next programming period 2014-2020 national and regional documents envisaged for allocation of EU funding. A major change in this new period is the fact that a separate operational programme 'Science, Education and Intelligent Growth" is envisaged for funding science and the "Innovation and Competitiveness" OP will include an innovation strand as a major priority for funding RTD. The "Environment" OP and the "Human Resource Development" OP also envisage some support for innovative project applications in the fields of environment and social innovations, respectively. The National Innovation Strategy envisages that RTD spending should reach 1.15% of GDP by 2013. Also, in 2010 the Government declared an ambitious national GERD goal for 2020: 1.5% - 2% of GDP. These targets however are out of line with the current level of RTD financing which has been decreasing in the recent years and as a result of the general economic crises. However, in the last 15 years the structure of the RTD financing has been showing a stable trend of increase of the private funding and decrease of the public funding shares in the overall GERD.

4.2 KEY POINTS FROM THE SWOT/ SOR ANALYSIS AND POLICY RECOMMENDATIONS REPORT

Based on the SWOT and SOR analyses carried out for Pazardzhik region within the project the following main conclusions can be drawn up:

- The most significant strength of the regional food business is the high quality of products and processes in the food sector. This is a serious advantage that should be exploited in order to take maximum benefit from the external factors which are expected to be present in the future. For the food RTD entities a strong point is the availability of highly skilled personnel in some areas of the agro-food sector.

- The second in importance are local traditions in the production and processing of food products and the good economic relations maintained with EU and international companies. For food RTDs a second strong point is the growing number of collaboration activities between R&D entities and companies in the sector and the developed network of RTD units in the sector with established system of research, training, teaching and advisory bodies.

- In terms of weaknesses regional food SMEs experience lack of funds to invest in modern equipment, know-how and production diversification. Since this is considered

of highest significance it should be dealt with the highest priority when considering future possibilities for food industry innovation. Other weaknesses of significance are the poor relations between food companies, RTD actors and organizations/institutions responsible for political decisions, and the poor innovation commitment and innovation mindset among entrepreneurs and managers in the food sector.

- For food RTDs the most significant weaknesses are extremely low size of the state budget for scientific development and out of date research infrastructure and equipment not managed effectively for the implementation of precise and profound scientific research.

- On the other hand, the most significant opportunities to be utilized to help boost the strengths and face the weaknesses of the regional food SMEs' innovation capacity are: EU funding for investment in production modernization; new programming period for EU funding allowing for giving priority to targeted support for food sector innovations; and available initiatives (ex. RAF regions project, InnoFOOD project) for establishment of clustering networks between business, research and policy makers.

- For the food research entities most significant opportunities are their access to European and international organisations' and research infrastructure and involvement in international research networks with available EU funds for research and exchange of knowledge; establishment of partnerships, networks, clusters, technology transfer units and other forms of cooperation; and launching of new European and regional programs for scientific and technology development.

- Significant threats that should be taken into account in future strategic policy planning in order to mitigate their influence are: 1. for food SMEs: increased competition from third countries; insufficient national and European funding for investments in RTD; and insufficient incentives targeted specifically for the food sector. 2. for food RTD entities: inadequate governmental concern for developing science and research; corruption and bureaucracy barriers; poor correspondence between funding programs and current research interests and innovation needs with slack market of scientific products and low absorption capacity.

The SOR analysis carried out based on the findings from the SWOT above indicated the following interdependencies:

1. For the food sector SMEs:

- The opportunities of having EU funding for investment in production modernization and of increasing trends for exports have the greatest chances of success for

contributing to develop further the current strength of the food industry of ensuring high quality of products and processes in the sector. On the other hand, in order to avoid the negative influence on this strength, targeted priority in future strategic policy planning should be given to dealing with possible increased competition from third countries and with possible insufficient national and European funding for RTD.

- Likewise, the two opportunities of having EU funding for investment in production modernization and of available initiatives (ex. RAF regions project, InnoFOOD project) for establishment of clustering networks are a good chance to consider for tackling the current weaknesses of lacking funds to invest in modern equipment and know-how and of poor relations between food companies, RTD and political decision-makers. The lack of funds to invest in modern equipment is also expected to be influenced to a great extent by the possible threats of having insufficient incentives targeted specifically for the food sector and insufficient national and European funding for RTD.

- 2. For food RTD entities:

- The opportunities of launching new European and regional programs for scientific and technology development have the greatest chance to contribute to the current strength of the food RTDs of having a developed network of RTD units in the AgroFood sector as well as established system of research, training, teaching and advisory bodies. In addition, the opportunity of establishing partnerships, networks, clusters, technology transfer units and other forms of cooperation should be grasped to develop further the current strength of having collaboration activities between R&D entities and companies in the sector. On the other hand, in order to avoid negative influence on this current strength and on the current availability of highly skilled personnel in some areas of the agro-food sector the threats of possible inadequate response of the educational system to the requirements and needs of the business and of inadequate or insufficient regulatory basis for developing symbiosis between science and business should be tackled in future policies.

- Likewise, the two opportunities of iintroduction of food issues as priority areas in science and launching of new European and regional programs for scientific and technology development are a good chance to consider for tackling the current weaknesses of low size of the state budget earmarked for scientific development and out-of-date research infrastructure and equipment. The currently low size of the state budget earmarked for scientific development is also expected to be negatively influenced by the possible threats of loss of intellectual potential, unattractiveness of the sector to the young people and negative public attitude to the image of the scientist, and of continued inadequate attention of the Government for developing

science, education and research, corruption and bureaucracy barriers. Therefore, these threats should be considered when formulating future policy measures.

As a general conclusion from the SWOT and SOR analyses carried out it can be said that in terms of overall strategic orientation of future food RTD policy planning it is vital to undertake an offensive strategy of attacking current weaknesses and future threats utilizing to a maximum extend the most significant opportunities and strengths of the regional food SMEs and RTD entities. Considering this in terms of political measures targeted political support should be provided in the future in order to improve research and innovation in the food sector. This is expected to facilitate the necessary transition to an economic model based on knowledge diffusion and innovation, by exploiting the opportunities offered by research and technological development for improving the competitiveness of the region in the food industry. In order to achieve this technology-based economic development and the innovation performance of companies should be enhanced through spreading the trend to innovative activities, supporting industrial research and R&D and innovation projects within enterprises. In addition, support for leading-edge research and the invention of new production methods by strengthening scientific and technological areas of strategic importance and infrastructures of public scientific research institutions should be given. Networking activities and cooperation among companies and research institutions should also be supported in order to respond better to the innovation needs of the industry and improvement of human resources in research and innovation should also be targeted.

Moreover, since current policies do not distinguish between research and innovation activities, strategic planning is necessary in the field of innovation based on intelligent specialisation to determine the long-term political vision for enhancing the development of innovation processes and facilitating scientific knowledge and results in reaching the business. Such strategic planning should also consider measures to enhance the innovation capacity of the country and increase investment in research and innovation in key sectors with development and growth potential and of high added value to the economy, the food sector being a priority among them. It should envisage modernisation of research and scientific infrastructure, enhanced cooperation between scientists and researchers, both within the country and internationally, and support to innovative entrepreneurs through targeted public measures.

In addition, targeted political support should also be provided to SMEs from the food sector as a priority industry. Food sector SMEs is second in significance with the second highest number of newly started businesses in the industrial production field but however, food companies are lagging behind EU SMEs in terms of technological development and knowledge-intensiveness. Therefore, political support for measures for starting new companies and improvement of staff

training and educational background as well as for encouraging entrepreneurship should be taken, along with measures for promoting exports, innovations and green technologies.

Above political measures should necessarily be supported by targeted public funding to improve research and innovation as a factor for competitiveness of the economy. Innovation is a key factor to competitiveness since in the period 2010-2012 only 0.6% of the national GDP was dedicated to innovations while the majority of SMEs have no capabilities to develop their own innovative solutions and the relations between RTD entities and the businesses are poor. Favourable conditions for innovation activities should be provided and cooperation between the business and RTD entities established while stimulating clustering in the food production sector.

Targeted public funding is also necessary to improve the quality of science, research and education. In the current programming period no targeted EU funding through an operational programme was given to science, research and relevant infrastructure while national funding was too low and even decreasing with cuts in funding to the National Innovation Fund (NIF) and the National Science Fund (NSF) – the two main instruments through which national public funding is provided to RTD entities. Therefore, specific need exists to introduce such an operational programme for the next programming period utilising the innovative approach of providing joint funding from both the European Social Fund and the ERDF. Not only will this instrument provide additional funding to R&D and innovation activities but it should also target the current mismatch between the quality of education and the quality of the research activities carried out which is more that evident in the food sector. Currently there is no institutional relationship between research activities and educational activities thus casting a negative effect on the innovation and research capacity by not familiarising students with the latest achievements in leading edge research. On the other hand only a few leading R&D entities deliver internationally comparable quality of their research and this is mostly of fundamental rather than applied nature since the results of the former (scientific publications) greatly outreach in number the results of the latter (patents, licenses, spin-offs), the ratio between publications and patents being 281:1.

4.3 DESCRIPTION OF KEY MEASURES

Name of the measure	Clusters in sectors with high development potential, incl. the food sector
Region	*Pazardzhik (Bulgaria)*
Timeframe	Medium Term (2- 5 years)
Rationale	Low level of RTD expenditure in enterprises and poor relations between research and the manufacturing industry are major reasons for poor innovation results currently observed in the region. The private sector is dominated by SMEs which do not have their own technologies or capacity to develop innovations of scale for specific sectors. Meanwhile, enterprises are facing huge difficulties with access to funding since most of them lack credit histories, experience in dealing with financing institutions and cannot meet the high requirements for guarantees since they have no clear visions for the future development of their businesses. Therefore, concentrated interventions are necessary in the sectors which have potential to carry our innovation activities, the food sector among the leading. Focused support will ensure more efficient distribution of EU funding since it will target "natural" clusters with traditions, human capital, good export positions and high potential for developing and implementing innovations in accordance with natural territorial specialisation of production and innovation activities. Such specialisation for food and agricultural production is available in the area of Plovdiv, a close neighbouring region to Pazardzhik and the major supplier of RTD in these sectors.
Particular sector and subsector	Agriculture, Food Processing, Food Industry
Objectives	➢ Improve partnership between research and business entities by establishing centres for cooperation activities, for commercialisation of research results and for links with national and international actors; ➢ Optimisation of technological commercialisation based on some existing technological centres and establishing a central technology transfer office for coordinating the network and providing advisory services, exchange of best practices, training, statistical information and dissemination of successful project results. ➢ Establish a network of thematically focused laboratories with one central one based in Sofia or Plovdiv to provide coordination and information and financing services, as well as training ➢ Encourage new entrepreneurs and initiatives by setting up incubators/accelerators for new start-up businesses. ➢ Provide grants for innovative business to fund studies, advisory services and trainings involved in innovations; ➢ Support services for design, development of new products, technology transfers, innovation management and engineering, quality certification, through a voucher scheme to facilitate the funding application and reporting processes for applicants; ➢ Provide institutional support to business-support organisations
Core activities	Support for technological parks, technology transfer offices, certification laboratories, business incubators, grants for investment studies, advisory services and training for innovative companies, innovation vouchers supporting cooperation between research and business

	entities, institutional support for business-support organisations in the field of property rights, standardisation and accreditation . Initiate legislation changes to allow for the establishment and registering of the so called “start-up” companies (currently this is impossible due to lack of legislation) and for the establishment of technological parks.
Implementing entity	Ministry of economy
Financial resources	“Innovations and Competitiveness” 2014-2020 national Operational Programme
Target groups	Food SMEs, research entities, consumer associations, business-support organisations in the field of property rights, standardisation and accreditation, etc.
Indicators for implementation success	- Number of entities applying for funding - Grants, funds and investments directed to the food cluster in Plovdiv - Number of patents/ number of spin- off

Name of the measure	Modernisation of R&D infrastructure and improvement of the capacity of RTD entities to apply research results
Region	*Pazardzhik (Bulgaria)*
Timeframe	Medium Term (2- 5 years)
Rationale	There is an urgent need for setting up modern information and technological research infrastructure to provide favourable conditions for innovations. On the other hand, the capacity of RTD entities and universities for applied implementation of research results also needs to be improved in order to facilitate take-up of research results.
Particular sector and subsector	RTD, science
Objectives	➢ *Setting up new and modernisation of existing research laboratories and equipment;* ➢ *Optimisation of the system of research organisations and universities to improve the quality of their scientific activities;* ➢ *Improve funding mechanisms for research and innovation and support research in strategic sectors, the food sector being among those on top of the list* ➢ *Encourage the development of partnerships and networking between laboratories, universities, research entities and business;* ➢ *Support the participation of research centres and universities in international networks, clusters and initiatives* ➢ *Technological improvement through introducing modern IT solutions in RTD entities and universities;* ➢ *Setting up and maintenance of informational portals for dissemination of research results*
	➢
Core activities	Support for new rooms, educational laboratories, libraries and museum collections of scientific archives, research laboratories at research centres and universities; support for establishment of centres of excellence in the food sector; support for total digitalisation of scientific and document content; support partnerships Support for maintenance of equipment already available in research entities – spare parts and consumables for running the equipment.
Implementing entity	Ministry of Education, Ministry of Labour
Financial resources	“Science and Education for Intelligent Growth” 2014-2020 national Operational Programme
Target groups	Researchers, innovators, academia staff, students
Indicators for implementation success	- Number of increased scores in the Innovation Union Scoreboard - Number of RTD infrastructure sites built - Share in the GDP of RTD expenditure of the public and private sector

Name of the measure	Improvement of the capacity of RTD personnel to apply research results
Region	*Pazardzhik (Bulgaria)*
Timeframe	Medium Term (2- 5 years)
Rationale	Bulgaria is among the last 30 in the world ranked by capacity of personnel in the educational field. Most often researchers are not motivated to acquire higher degrees since this does not necessarily entail better incomes resulting in an out-flux of brain drain to EU and other countries leading to a notable ageing of the scientific and research community. Adding to these the constantly negative demographic trends results in a major problem for the country of insufficient and inadequate human resource in science, research and innovations. The number of personnel and researchers involved in scientific research and innovations is among the lowest in Europe. On the other hand, a serious deficiency in high qualified labour with potential for developing and applying research and innovations is present placing challenges to the future development and functioning of entire sectors of the economy and the social sphere. This raises the issue of the quality of current education and matching it with current needs and trends of the industry and research.
Particular sector and subsector	RTD, science
Objectives	➢ *Updating of academic curricula of relevant university departments in order to better match the current industry trends and innovation needs* ➢ *Improve the capacity of researchers and innovators in the field of entrepreneurship and intellectual property rights;* ➢ *Setting up a system for registering, protection and management of intellectual property rights resulting from public funding research* ➢ *Support for education and research capacity in the field of fisheries and aquaculture;* ➢ *Support for qualification and mobility of educational and research personnel to match the requirements of the labour market*
	➢
Core activities	Support for trainings for re-qualification of researchers according to EU priorities and for career development of researchers in priority research areas; support for stimulating students to participate in innovative research activities; support for developing a system for evaluation of research results and support for setting up a Register for research activities; support to attract foreign researchers for priority research activities; support for dissemination of research results (scientific conferences, forums, workshops, congresses, etc.); support for acquiring information for research activities through access to national and EU info databases), support the participation of Bulgarian researchers in EU and international networks and partnerships; Support and tax incentives for business organisations funding research activities; support for companies funding master's and PhD degrees on topics to be applied in their production. Support for establishment of business – university committees for

	improvement of curricula such as the inclusion of entrepreneurship subject. Support for the establishment of centres for career development in universities along with business organisations (companies, associations). Support for awareness rising and marketing for RTD supply. Support for maintenance of accreditation of laboratories and scientific units
Implementing entity	Ministry of Education, Ministry of Labour
Financial resources	"Science and Education for Intelligent Growth" 2014-2020 national Operational Programme
Target groups	Researchers, innovators, academia staff, students
Indicators for implementation success	-Number of research and education staff with enhanced qualifications - Number of increased scores in the Innovation Union Scoreboard - number of research results (publications, patents, licenses, spin-offs)

5. ROMANIA

5.1 DESCRIPTION OF THE REGIONAL CURRENT STATE OF PLAY

INTRODUCTION

Romania is a country located in the South-East of Central Europe, on lower Danube, in the northen part of Balkanic peninsula and on the north-western side of the Black Sea. On its teritory is included almost Danube Delta area and the southern and central part of the Carpathian Mountains. Its neighbours are Bulgaria in the South, Serbia in the South-West, Hungary in the North-West, Ucraine in the North and in the East, The Republic of Moldavia in the East and the Black Sea side in on South-East. Romania has a surface of 237.500 km^2 and it is the second biggest East European country after Poland (312.685 km^2) having almost the same surface as the United Kingdom of the Great Britain and Northern Ireland.

ECONOMIC ACTIVITY

Main industries are: textile and leather industry; metallurgical industry; building machines industry; mining industry; wood processing industry; construction materials industry; chemical and petrochemical industry; food industry; IT industry.

In 2010, the economy is based on services (55% of GDP) and industry and agriculture had a contribution of 35% and 10% respectively. In the same time, 32% of the working population is involved in agriculture and production, one of the higher rate in Europe.

As a result of world economic crisis**, the Romanian GDP** decreased with more then 7% in 2009, which forced the Romanian Goverment to ask for the International Monetary Fund (IMF) and European Union emergency package of 26 billion euro. In 2010, due to the restriction measures, the Romania's GDP decreased with 1,3%, but in 2011 the economy had a lower increasing, due to the exports and of an outstanding agricultural crop, together with a weak request of the internal consum.

The industrial production of Romania increased with 2.8% in April 2012 versus April 2011. The industrial production is an important indicator for the economic forecast and often is used to the measurement of the inflation pressure against the prices variation.

Accordingly with the Report of the Ministry of Agriculture and Rural Development (MADR) in April 2012, at national level, agriculture is one of the most important sector of the economy.

The contribution of agriculture, forestry and fishery is about 6% of GDP, in comparison with the EU member states which is about 1.7%. **The Land Fund**, accordingly with the Agricultural Register of 2010, out of the 23,8 million ha of Romanian teritory, the used agricultural area is representing about 62.1% (14,8 million ha) and out of which 8.3 million ha is arable land. This is the highest percentage between the European Union member states. **About 4.9 million people work in agriculture**, fishery and forestry industry, representing 42.8% out of the total labour force.

Nowadays, 85% of the agricultural surface is privatised. But these lands are usually small. Out of 3.9 million land owners, 40% is working less then 1 ha and only 0.6% of the farms have more then 10 ha.

SOUTH-EAST DEVELOPMENT REGION

INTRODUCTION

Location: The South-East Development Region is neighbouring in the North with The North-East Development Region, in the West with Center Development Region in the South-West with South-Muntenia Development Region and Bucharest-Ilfov Region, in the South with Bulgaria and in the East with Republic of Moldova, Ukraine and the Black Sea.

The Region has a surface of 35,762 km^2, being the seconf largest development region of Romania (15% of the country's territorial area).

ECONOMIC ACTIVITY

The region is participating with 11.2% of the national GDP, the 6th place between the 8th Development Regions of Romania. The GDP per capita in 2008 has a maximmum in 2008 with a Region's average of 5.368 euro (but varying between 3,242 euro of Vrancea county to 6,709 euro of Constanta county).

The Economic structure of the Region and their components contributions to the Regional GDP: **agriculture and forestry with 22%;** industry with 22%; constructions with 11%; trade with 9%; hotels and restaurants with 2%; transportation and communications with 10%; others 24%

Main export issues (and percentages) from the region in 2009: 27.5% - spare parts for machines, aircrafts, ships and other transportation means; 25,5% - metals and metal manufacturing products; 19.8% - mineral products

In 2008, 26% of the labour force has been concentrated in a couple of large companies in the region and these companies concentrated 40% of the gross investments. The SMEs of the Region are acting mainly in trade, real estate and manufacturing sector. In 2008, the total number of registered companies in the region was 59,783 out of which 99.63% were SMEs (59,560 small and medium companies)

The industry in the South-East Development Region includes companies from: **food sector**; leather sector; mechanical and metallic products sector; petro-chemistry sector; ship construction sector; electrical equipments sector

BUCHAREST-ILFOV DEVELOPMENT REGION

INTRODUCTION

Location: The Bucharest Ilfov Development Region is located in the southern part of Romania, being surrounded by the South-Muntenia Development Region. It is constitued by the largest metropolitan area of Bucharest (the capital city of Romania) and the smallest county of Romania (Ilfov). The Region has a surface of 1,821 km^2 (0.76% of the country's territorial area) being the smallest Development Region as area. 13.1% of the region's territory is the city of Bucharest and 86.9% is the area of Ilfov county.

ECONOMIC ACTIVITY

The region is participating with 26.1% of the national GDP, the 1th place between the 8th Development Regions of Romania. The GDP per capita in 2011 was 13.164 euro, due to the

development status of Bucharest metropolitan area, which is 111% over the EU-27 average. **The main export issues** (and percentages) for the region in 2009: 10.2% - machines and devices, spare parts for TV and recording devices; 12.7% - mineral products; 11% - vegetal products; 9.4% - metals and metallic products. Other export issues: edible oils, food and drinks, chemical products, plastics, leather products and wooden products.

The Economic structure of the Region (2010) and their components contributions to the Regional GDP: agriculture and forestry with 0.3%; industry with 12.8%; constructions with 13.7%; services with 64.3%; others 9%. The Bucharest-Ilfov Development Region has a strong development of the services which include: financial and insurance; public administration; real estate; trade and retails; hotels and restaurants.

THE AGRICULTURAL SECTOR AND FOOD INDUSTRY

AGRICULTURE

The contribution of agriculture, forestry, hunting, fishery and nurseries in GDP had a variable evolution, with a maximmum of 7.8% in 2006 and a minimmum of 5.8% in 2007, after then varied between 6.0 and 6.5 between 2008 and 2011. In 2010, the value of agricultural production was about 16,000 million euro (with +1% bigger then in 2009) and its distribution was: +6.6% the vegetal one, -6.8% the animal one and -26.5% agricultural services. Despite the important agricultural resources, between 2006-2010 the production had an under-potential evolution, due to the non-favourable weather conditions, as well as the insurance way for agricultural inputs and the performing of specific agriculture works.

In 2010, a production of 5,774 thousand tones of wheat (+4.5% more then 2006) and 9,008 thousand tones of corn (+0.3% more then 2006) has been registered. One year before, in 2009, production of 1,267 thousand tones of sunflower and 3,284 thousand tones of potato has been registered also.

The productions of fruits and vegetables had a variable evolution, in 2010 the quantities had been 3.875 thousand tones and 1.420 thousand tones respectively. The pork and cattle meat productions decreased in 2010 in comparison with 2006, the only increasing was registered at chicken meat production.

FOOD INDUSTRY

The food industry is Romania is having a turnover of about 10 billion euro annualy, meaning a contribution of 8% to the GDP and offers jobs for about 200,000 people, accordingly with Romalimenta - the Federation of Food Patronal Association. In 2010, the food industry has been the third industry of Romania based on turnover.

The sub-sectors: *the meat processing* had a turnover of 1.3 billion euro, *bakery* had 1.1 billion euro and *non-alcoholic drinks* had 1 billion euro. Important contributions had *meat production* with 840 million euro and *diary* with 800 million euro.

The Food industry in Romania had an annual turnover of 9,76 billion euro in 2010, the third position of the country industries standing, with a contribution of 8% of GDP. The production of food industry had an increasing of 5% in 2006 against 2005 and a 25.5% increasing in 2010 against 2005.

Also, in 2010, there were registeres 185,000 employees (accordingly with Romalimenta) a decreasing from 2006, 2007 when more then 200,000 employees have been counted. The same food patronal federation announced an average of 10 billion euro annually turnover for the period of 2006-2010.

Meat processing sector had the most important contribution with an annual turnover of 1.3 billion euro, bakery had 1.1 billion euro and non alcoholic drinks with 1 billion euro. Also, the meat production sector had an annual turnover of 840 million euro and diary production sector had 800 million euro.

The number of economic agents in food industry is slighty bigger then 10,000 units, a constant number between 2006 – 2010. The National Institute of Statistics prepared a monthly booklet of international trade of Romania and shows in the last issues of 2012, the following data for food industry:

- food production in March 2012 increased with 107,8% against March 2011;
- food production in March 2012 increased with 118.2% against February 2012;
- food production in the first three months of 2012 increased with 103.3% against the similar period of 2011

EXPORT OF AGRICULTURE AND FOOD PRODUCTS

Type of products

The types of products included in the monthly booklet of the National Institute of Statistics:

- Meat and edible offal
- Fish and crustaceans, mollusks and other aquatic invertebrates
- Milk and diary products; eggs; honey; edible animal products
- Edible vegetables, roots and tubers
- Edible fruits
- Coffee, tea, mate and spices
- Cereals
- Products of the milling industry, malt, starch
- Seeds and fruits; industrial and medicinal plants; straw and fodder
- Preparation of meat and fish
- Sugar and confectionery
- Cocoa and cocoa preparations
- Preparations of cereals, flour, starch, milk, pastry products
- Preparations of vegetables, fruits
- Alcoholic and non-alcoholic beverages; vinegar

Distribution channels

- Large networks of retails – the European retails networks are in Romania (Billa, Carrefour, Cora, Auchan, Kaufland, Lidl, Penny, etc);
- Large storage for importing food products;
- City public markets;

SOUTH-EAST DEVELOPMENT REGION

AGRICULTURE

- **By tradition, the South-East Development Region is an agriculture area**. The main cereals: corn, wheat, oats, industrial plants, sunflower. The useful agriculture area is 2.332.000 ha meaning 15.85% of the total agricultural area of Romania. Here it is the second agricultural exploitation area in Romania.
- **30.47% of the region's population is involved in agriculture** and 95.26% of the total agricultural production is coming from the private sector.
- The region is having the largest vineyard area in the country (covering about 40.2% of the national vineyards area) producing wines which are very well known in abroad
- The region is also having the largest production of sheep and goats meat and the largest production of wool.
- The region is the second in the country as production of eggs, the forth place at swine meat and fifth place at chicken meat.
- Ecologic agriculture is having 62.514 ha in the region (28.2% of the total national ecologic agriculture), but it still represent only 2.68% of the overall agriculture area.
- The number of the registered entities in 2009 as acting in ecologic agriculture was 331 (8% of the total national entities) in the sector).

FOOD INDUSTRY

In 2009, the region counted 1,699 licenced companies in the food industry: 163 in the milk and diary sector; 99 in the meat processing sector; 788 in the milling and baking sector; 14 in the can producing sector; 51 in oil processing sector; 2 in the sugar and sugar beat processing sector; 247 in the sugar products manufacturing sector; 335 in the beverages sector;

BUCHAREST-ILFOV DEVELOPMENT REGION

AGRICULTURE

Due to the capital city of Bucharest, the agriculture area is considered only for the Ilfov county and the figures for the agricultural area in 2009 were the followings: arable area: 102,245 ha; pastures area: 1973 ha; hay area: 58 ha; vineyards area: 1,412 ha; orchards area: 847 ha;

The volume of the agriculture production in 2009 was about 130 million euro, out of which: vegetal production - about 70 million euro; animal production – about 55 million euro; agricultural services – about 5 million euro

The vegetal production in the Ilfov county in 2009: Cereals for seeds: 96,790 tones; Wheat: 51,022 tones; Barley: 8,646 tones; Sunflower: 33,687 tones; Potato: 14,336 tones; Grapes: 5,300 tones; Fruts: 3,642 tones;

Animal production in the Ilfov county in 2009: cattle meat: 2,835 tones; swine meat: 24,258 tones; sheep and goats meat: 394 tones; chicken meat: 1,739 tones; milk: 453 hl; wool: 63 tones; eggs: 102 millions; honey: 241 tones

5.2 KEY POINTS FROM THE SWOT/SOR ANALYSIS AND POLICY RECOMMENDATIONS REPORT

Results of the SWOT Analysis focusing on RTD entities

Strengths

- Higly skilled personnel
- Open exchange of experience in research and technology development Public-private cooperation
- Strong research base
- Increasing number of collaboration with firms
- Public-private cooperation

Weaknesses

- Low size of budget for R&D
- Not enough start ups
- Weak understanding between researchers and industry complicates joint projects
- Poor linkage between firms and research entities
- Lack of formal collaboration between actors

Opportunities

- New R&D European and regional programmes
- Networking
- Availability of EU R&D funds for research
- Surplus of well-educated researchers
- Increasing demand for more/better varieties

Threats

- Brain drain
- Few incentives for university researchers to engage in collaboration with the industry
- Bureaucracy barriers
- Funding programmes to support research with content far from current research interests
- Failure to attract international researchers

Results of the SWOT Analysis focusing on the needs of the SMEs

Strengths

- Product and Process Quality
- Product Diversification
- Highly skilled personnel
- Geographical position
- Management capacity

Weaknesses

- Poor networking with public actors
- No international orientation
- Low financial capacity
- No dedicated R&D unit
- Low technology level

Opportunities

- Strong regional/national product identity
- Availability of R&D funds for research and innovation
- Increasing export trends
- Networking possibilities (associations, technology platforms, fora, etc)
- Existing RTD & innovation programmes tailored to the sector

Threats

- Insufficient incentives addressed to the sector
- Bureaucracy / Regulation barriers
- Scarce funding resources for R&D available
- No political long-term commitment to the sector
- Need of adaptation to new regulations, normatives and priorities

Strategic Orientation of the Food Sector of the Region

	Opportunities	**Threats**
Strengths	**Attack 160**	Defence 109
Weaknesses	Reorientation 129	Crisis 104

General prospect for the research units is to ATTACK. As the table shows, the highest score was obtained in the “attack” quadrant: 160. This means that innovating system in the research area has good strengths to grasp some promising opportunities, that the chances for success are high.

The main opportunities:

- New R&D European and regional programmes

- There is a strong networking between the actors of the research system
- Availability of EU R&D funds for research

The main threats:

- Brain drain
- Failure to attract international researchers

The main strengths:

- Open exchange of experience in research and technology development
- Highly skilled personnel

The main weaknesses:

- Poor linkage between forms and research entities
- Weak understanding between researchers and industry complicates joint projects

Based on the SOR matrix, the following observations can be made:

(i) The capacity to attract **new R&D European and regional programmes** (O=67) should be improved by using more efficiently the **strong research base** (S/O=11) and by maximizing the open exchange of experience in research and technology development. This will enable the food science community to face the **failure to attract international researchers** (T=58).

(ii) The food science community should exploit the opportunity of an intensive **networking** (O=64) by using **the highly skilled personnel** (S/O=12). In order to grasp this opportunity, the **poor linkage between firms and research entities** should be minimize (W/O=12).

(iii) The food science community should take benefit about the **availability of EU R&D funds for research** (O=61) in order to develop innovative, safety and secure food products. Currently, exists a **weak understanding between researchers and industry which complicates joint projects** (W/O=9), however, **public - private cooperation** can help in attracting European funds for research (S/O=11).

Focus on food industry

	Opportunities	**Threats**
Strengths	**Attack 289**	Defence 140
Weaknesses	Reorientation 214	Crisis 192

General prospects for the industry is to ATTACK. The highest score was obtained in the “attack” quadrant: 289. A high score of S/O combinations can be translated into good chances of maximizing the opportunities using all strengths.

The main opportunities are:

- Availability of R&D funds for research and innovation
- Increasing export trends

The main threats are:

- Insufficient incentives addressed to the sector
- Scarce funding resources for R&D available

The main strengths are:

- Management capacity
- Product and process quality
- Highly skilled personnel

The main weaknesses are:

- Poor networking with public actors
- Low financial capacity

The SOR matrix suggests the following observations:

- The capacity to attract **R&D funds for research and innovation** (O= 111) should be improved by high **product diversification** (S/O=17) and by using the most valuable resource of a company, **highly skilled personnel** (S/O= 15). This will enable the food companies to face the problem of **cofinancing** (T=87).

- The food companies should take into account that the export trends are increasing (O=108) and for that they should valorise the management's capacity (S/O=17). Although, in order to take the advantage of this opportunity, the **international orientation** should be reopened (W/O=19).

- The research activity in the food sector should be supported and should take the advantage of the existing **RTD& innovation programmes tailored to the sector** (O=96) **by constantly improving product quality (**S/O=15) **and product diversification** (S/O=14). The industry should also **think of their own R&D units** (W/O=14)**,** in order to grasp this opportunity**.**

Recommendations and Remarks

(i) Both SOR analysis go for "ATTACK", showing a positive perspective for RTD units and sectorial SMEs. The strengths could be improved, to use the new coming opportunities:
- i.e. continuing to have high skilled personnel and strong research base in the RTD units is a guarantee that international networking and the new European and regional programmes will be accessed with applications. In the meantime, product and process quality in the industrial SMEs may support the sector to keep the strong national/regional product identity and to make possible the access at existing RTD and innovation programmes tailored to the sector;

(ii) there is a fact that it is still a poor linkage between industry and research in the country which create also a weak understanding between researchers and industry experts. Using the opportunity of the increasing networking possibilities (like professional associations, clusters, technology platforms, for a) is the most direct answer to minimize the weakness and in time the cooperation between industry and research to become a strength.

(iii) in the country and in the country's regions there are no direct programmes for food sector (the food thematic lines are part of the general programmes). Launching such sectorial programmes will be a larger opportunity for the sectorial RTD units and SMEs and it would be the task of the consortium to find innovative tools to propose them to public authorities in charge for RTD and innovation which may consider in the future to promote a sectorial food program.

4.3 DESCRIPTION OF KEY MEASURES

These recommendations arose from the results of SWOT analysis and SOR and have been thought to be realistically adopted in the local or national context.

Name of the measure	*Increasing the industrial skills in transfering technology and research results*
Region	*Romania*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*There is a need for strengthening the skills of industrial engineers to present the company technological needs and to identify the appropriate research expertize and to be able to handle the technology transfer issues.* *Industrial staff has to learn to "understand" the researcher language and to present their company technological needs in a form to identify the possibility of transferring the research results or to generate research results in favour of their companies.*
Particular sector and subsector	*Agriculture and Food Industry*
Objectives	*To create within companies from food and agriculture sector, trained people (staff) able to identify and to match the company needs with available research expertize, in order to increase the technology transfer from research units (including universities) to industrial companies, especially those who are producers and food processors.*
Core activities	- *training sessions for industry staff;* - *pilot mobility sessions of industry within research labs;*
Implementing entity	*Association "Food for Life"*
Financial resources	*The Romanian Agency for Financing High Education Research, Development and Innovation (UEFISCDI" has a programme dedicated to innovation and one implementation tools is called "innovative services for companies/SMEs"*
Target groups	*Food companies (large and SMEs) and Agriculture farmers' associations*
Indicators for implementation success	- *no. of training sessions;* - *no. of industrial staff trained;* - *no. of industry – research matching created;* - *no. of industrial visits to corresponding research labs*

Name of the measure	***Increasing the marketing skills of researchers or R&D units staff for valorising of research results***
Region	*Romania*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The research units (including universities) have good expertize in developing lab research, but very little skills to promote them outside the research unit and to transfer the results to corresponding industry.* *In the meantime, the researchers are very little able to identify the industrial needs and to respond to them by innovative research results and they also have difficulties in match the industry within national and collaborative projects.* *More, the food industry is not valorising the research at its value and is not looking to research as a service which may improve their competitiveness and to help them to make a step ahead on the market*
Particular sector and subsector	*Agriculture and Food Research*
Objectives	*To create within research units (including universities), trained people able to offer innovative services to industry and to SMEs, to match the research expertize with the industrial needs and to be able to identify and to launch new collaborative projects.*
Core activities	- *training sessions for research staff*
Implementing entity	*Association "Food for Life"*
Financial resources	*The Romanian Agency for Financing High Education Research, Development and Innovation (UEFISCDI" has a programme dedicated to innovation and one implementation tools is called "innovative services for companies/SMEs"*
Target groups	*Researchers or R&D staff from research institutes or universities*
Indicators for implementation success	- *no. of training sessions;* - *no. of research staff trained;* - *no. of research - industry matching created;* - *no. of research results transferred to industry*

Name of the measure	*Increasing the dialogue between research and industry*
Region	*Romania*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The SWOT/SOR analysis identified as a major barrier in promoting innovation the low level (and several times quality) of the local, regional and national dialogue between research units and food industry.* *The analysis done also identified very few innovative projects in the food sector (including the agriculture extension) in different national and international innovation programmes.* *The dialogue is not constant and there are difficulties in matching the interests of researchers with those of the industry, not mentioning the too different approach (the researchers are very enthusiastic in proposing everything, the industry is very reluctant in introducing innovation which has a technological risk of up scaling the lab research results and commercial and marketing prospective is not very clear.* *Only bringing together both actors – researchers and industrial experts – it is a possibility of matching their interests and approaches and identifying new partnership opportunities.*
Particular sector and subsector	*Agriculture and Food Industry and Research*
Objectives	*To identify and to launch new collaborative projects (with industry and research participation) at national or regional level. The projects are designed to help the food industry to promote and to transfer research results and to generate marketable innovative products.In the meantime, the research units is helped to develop innovative services for industry (including creation of spin-offs and start-ups) to valorise their research results.* *There is also a possibility for extended the national or regional partnerships with international collaborations and offering the local industry and research an access to international research expertize and possibility of accessing new markets for their innovative products.*
Core activities	- *to organise brokerage events and partnering events for identifying and launching new collaborative projects*
Implementing entity	*Association "Food for Life"*
Financial resources	*The Romanian Agency for Financing High Education Research, Development and Innovation (UEFISCDI" has a programme dedicated to innovation and one implementation tools is called "innovative services for companies/SMEs"*
Target groups	*Industrial companies (including SMEs), research units (including universities), centers for transfer of technologies, brokers of innovation, business intermediates, financing authorities;*
Indicators for implementation success	- *no. of brokerage events;* - *no. of companies participating;* - *no. of research units participating;* - *no. of project proposals identified and launched;* - *no. of spin-offs and start-ups created or ongoing;*

Name of the measure	***Updating academic curricula to match current food innovation trends***
Region	*Romania*
Timeframe	*Medium Term (2- 5 years)*
Rationale	*The analysis on Romanian food academic curricula showed the need to include new topics, in order to transfer advanced knowledge on emerging research themes in the field of biotechnology, food processing, food safety and security, health aspects, management and innovation, research policies.* *These topics should be complementary to basic disciplines.* *Ex: Nutrition, New Product Development, Cosumer Behaviour*
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	➢ *to update academic curricula by including new emerging topics relevant to food innovation, according to a multidisciplinary approach* ➢ *to update skills useful for innovation management.*
Core activities	*Core activities will be represented by the proposal for new contents to be added as a basis set of food innovation topics, and to be approved by the Ministry of Education and Research including management, emerging technologies and demand-side.*
Implementing entity	*Ministry of Education and Research (at strategic level) and Universities (in terms of implementation, according to their own independence to define curricula)*
Financial resources	*The Romanian Agency for Financing High Education Research, Development and Innovation (UEFISCDI" has a programme dedicated to innovation and one implementation tools is called "innovative services for companies/SMEs"*
Target groups	*Universities*
Indicators for implementation success	*No. of new topics included in academic curricula*

Name of the measure	Applying innovative and new technologies to perform research (biotech, ICT, etc.)
Region	*Romania*
Timeframe	*Medium Term (2- 5 years)*
Rationale	Agricultural production needs to substantially increase to meet global food, feed, fiber and energy demands in the face of population growth. Innovative agricultural technologies need to continue to play a critical role in addressing these challenges, in contributing to increased food production in a sustainable way, and in mitigating the adverse effects of climate change. The new technologies on agricultural practice/food chain will have impact on the: development of biotech for bio-remediation of soils, technologies for protection of natural resources, for management of water and soil resources, agricultural production of raw materials for the industry, energy resources, increase of income of population, increase of consumption requirements, development of underdeveloped regions, increase in life standard of Romanian population in line with EU standard.
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	• Genetically markers, introduction of technologies less time and resource consuming, automation of research, cheaper and faster research, use of predictive models; • All the above are hardly affordable, people do not have enough capacity to use all the above technologies. • Knowledge based IT innovations in agriculture.
Core activities	*Core activities will be represented by the proposal for new contents to be added as a basis set of food innovation topics, and to be approved by the Ministry of Education and Research including management, emerging technologies and demand-side.*
Implementing entity	*Ministry of Education and Research (at strategic level) and Universities/Research Institutes (in terms of implementation)*
Financial resources	*The Romanian Agency for Financing High Education Research, Development and Innovation (UEFISCDI" has a programme dedicated to innovation and one implementation tools is called "innovative services for companies/SMEs"*
Target groups	*Researchers, Food companies (large and SMEs) and Agriculture farmers' associations*
Indicators for implementation success	- Economic development following industrial application of new technologies - Increase of the researchers' competitiveness on EU level.

Name of the measure	Developing R&D projects on food security
Region	*Romania*
Timeframe	*Medium Term (5 years)*
Rationale	Agricultural production is not the only component determining people's food security. The UN-FAO World Food Summit 1996 created a defined food security: "Security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life". This field covers the aspects of: supply and utilization of food, processing, packaging, distribution, retail and economic access.
Particular sector and subsector	*Agriculture, Food Processing, Food Industry, Biotechnology*
Objectives	- Technical and Financial Support: Investing in international, regional, national and local activities with reference to infrastructure, roads, telecommunications, electricity, irrigation, supporting people through health, educational and nutritional programmes - Appreciation and support for small and medium-sized producers, participation of communities - Sustainable production methods should be implemented according to needs of local conditions, markets and consumer demands - Support more vulnerable farmers through assessment and provision of market and weather information, crop insurance, debt restructuring, and shifting from disaster relief to early warning systems to ensure, as far a possible action well in advance of food emergencies, as well as develop contingency plans to tackle emergencies - Adopt an ecosystems approach to agricultural production - Limiting unnecessary applications of pesticides and herbicides - Enhancing food nutrition - Increasing participation: Increased capacity building and efforts to involve local communities and especially the poor, in designing, implementing and monitoring projects. Involves sharing knowledge and good practice examples - Education: Developing and supporting vocational schools to train and educate around sustainable food principles
Core activities	*Core activities will be represented by the proposal for new contents to be added as a basis set of food innovation topics, and to be approved by the Ministry of Education and Research including management, emerging technologies and demand-side.*
Implementing entity	*Ministry of Agriculture and Rural Development, Ministry of Education and Research (at strategic level) and Universities/Research Institutes/Industrial companies and SMEs (in terms of implementation)*
Financial resources	*The Romanian Agency for Financing High Education Research, Development and Innovation (UEFISCDI" has a programme dedicated to innovation and one implementation tools is called "innovative services for companies/SMEs"*
Target groups	*R&D staff from research institutes and universities, Food companies (large and SMEs)*
Indicators for implementation success	• *No. of projects funded on the field.*

6. SLOVENIA

6.1 DESCRIPTION OF THE CURRENT STATE OF PLAY

Slovenian agro-food sector is relatively small in terms of its contribution to the national economy. The shares in GDP, employment and trade have fallen since the beginning of the 1990s and are expected to decrease further, mostly due to the faster growth of non-agricultural sectors of the economy. The key determinant of situation in the national agro-food sector is the fact that the natural conditions for agriculture are relatively unfavourable in Slovenia and that the structural deficits impede competitiveness growth of the food industry.

Agriculture

Natural conditions for agriculture are relatively unfavourable in Slovenia. Availability of land for agricultural production is limited in Slovenia, with forests covering more than 60% of the country's territory. The agricultural area accounts for about 30% of total land and its area has been steadily declining due to expansion of forests, built-up territories and new transport infrastructure. The greatest share of the structure of agricultural land use is covered by permanent grassland and pastures (58 %), followed by fields (36 %) and perennial crops (6 %).

Agricultural production in Slovenia still depends greatly on weather conditions; as a consequence, the volume of crop production varies considerably between years. The volume of livestock production is more stable, even though there are some oscillations due to cyclical changes in livestock numbers in the pre-accession period. The sectorial structure of agricultural output has remained almost unchanged in last decade, with livestock and crop production accounting for about 50% of GAO each. Milk and beef production are the most important livestock sub-sectors, followed by pig and poultry production. In the structure of crop production, beside forage plants, fruits and wine together represent the highest share of GAO, followed by cereals.

Food Industry

Slovenian food processing industry is economically and technologically rather advanced, when compared to other EU new member states, however the key competitive pressure recently comes from the expansive companies from incumbent members. Therefore, the opening up of the food market after the Slovenia's EU accession affected business performance significantly. The number of registered business subjects in the food processing industry increased significantly in the last five years however the number of employees is in decline. The revenues that the food sector generated in 2010 were only slightly lower than in 2006, while value added decreased by 1,4% in nominal terms.

The food processing industry, with 8,5% of employees is the third major employer in Slovenian processing sector, after the metalworking industry and the production of electric devices. Meat processing and the bakery sectors are two major activities, in terms of the number of companies and employees, together accounting for more than a half of all employed in the food industry. In terms of sales value the share of meat processing industry is around 30%, while the bakery sector contributes 14%, and the same share comes from the dairy industry (AJPES, 2012).

In the period of last fifteen years food-processing companies in Slovenia have been facing several challenges. Initially the problems were consequence of the loss of markets in the republics of former Yugoslavia and, later, as the impact of Slovenia's accession to the European Union which brought severe market competition. So the adjustment to new circumstances and restructuring of companies was vitally necessary. Most Slovenian food enterprises have been modernised, despite to a rather high level of standards even in the Yugoslav times. As a result elements of competitive advantage were formed, and now Slovenian food enterprises possess a fair potential for development. A lot of companies are inward-oriented and primarily supply the domestic market or traditional export markets in former Yugoslavia. Therefore, further internationalisation is needed to attain the economies of scale in the companies with overcapacities. Concentration in retail trade has been increasing in the last decade in Slovenia which reflects most obviously in the pressures on purchase prices, shifting of an increasing share of transaction and distribution costs to suppliers, and in other demands and conditions for cooperation. Retailing industry having an increasing control over the economic flows is a global phenomenon, but it is clearly present also in Slovenia. It is therefore often stated that the economic dominance of retail trade is currently the key reason behind the deteriorated economic position of food-processing industry. Moreover, Slovenian food-processing industry, when fighting against the strategies of leading retail companies, often unwillingly reacted in favour of the trade companies.

The National Research and Innovation Framework

In Slovenia, to a large extent, scientific research is conducted at **Universities**. Slovenia has five Universities, namely: University of Ljubljana, University of Maribor, University of Primorska, University of Nova Gorica and Euro-Mediterranean University. The first three are public universities, funded for their academic tasks mostly by the Government, while the University of Nova Gorica presents a public-private partnership. The Euro-Mediterranean University is an international network of universities (38 countries) and it was established as one of the six priority areas of the Union for the Mediterranean with the aim to enhance the collaboration among partner institutions. Within the five universities, there are more 60 different Higher Education Institution (HEI) in all academic fields. Currently prevailing funding system for higher education in Slovenia separates the educational funding from the research one. When it comes to research, HEIs are treated as any other public research unit and apply for research funds through public calls for research programmes/projects at Slovenian Research Agency, so one could say competitive funding prevails. The HEI's can also raise support for the research activity from business sector. Due to relative independence of the research units (often called institutes) it is difficult to clearly establish the amount of financing coming to HEI from different sectors (Erawatch, 2012).

In addition to the Universities there are 47 **Public research organisations** (PRO), non-university research institutes, which contribute to the country's knowledge base with a comparable share as the university system. The third category of research performers in Slovenia is **Business sector R&D units** which have experienced a considerable growth in the last decade. Structure of the business R&D expenditure reflects the predominant role of manufacturing in the country, and within the manufacturing sector two sectors stand out: chemicals, specifically pharmaceuticals, and machinery and equipment, especially electrical equipment. The research organisations in the business sector, however has a significantly lower educational level than those in the public research sector, since only 11% of all researchers holding the PhD work in the business sector (SORS, 2011). The interface between the universities, PRO and Business sector R&D are the **Public-private Research**

and Technology Organisations. These institutions can be split into two categories in Slovenia: (1) bridging institutions, namely Technology Centres, Technology Platforms, Centres of Excellence, Clusters) and (2) support institutions, namely Technology parks.

Entities in support of food R&D and innovation

Tare only very few entities in Slovenia where R&D and innovation aiming at food industry are executed, moreover the typology of research is mainly scientific, and therefore with some limitations applicable to the business sector.

Research and development in the area of food industry is mainly the domain of two largest Slovenia's universities. The **University of Ljubljana**, the country's largest university with its 56,000 undergraduate and post-graduate students, it ranks also among the largest universities in the world. The Biotechnical Faculty (http://www.bf.uni-lj.si/) of the University of Ljubljana carries out research, professional, and advisory services in the areas of nature (biology, microbiology), agriculture, forestry and fishery (forestry, animal science, agronomy) and in the closely related production technologies (wood science, food science, biotechnology). All the educational and research disciplines carried out at the Biotechnical Faculty incorporate the issues of the management of natural resources (soil, space, flora and fauna, water). Researchers at the Biotechnical faculty participate in numerous national and international interdisciplinary projects. The research work related to food is organised under several Chairs within the department of Food Science and Technology and Department for animal science (Dairy institute, Chair for agricultural economics, policy and law).

The **University of Maribor**, second largest university includes 17 faculties with about 20.000 undergraduate and post-graduate students. Food related research is predominantly conducted as a joint initiative of the in the Faculty of Agriculture and Life Sciences and the Faculty of Medicine. Research is particularly related to "Food safety and health" within the inter-faculty Chair of microbiology, biochemistry, molecular biology and biotechnology. There are also other units that conduct research partly related to food industry at the Faculty of Agriculture and Life Sciences (Chair of Viticulture and Enology, Chair of Agricultural Economics and Rural Development, Chair of Fruit production and Fruit Processing).

The **Agricultural Institute of Slovenia** is a public research institution founded in 1898. The status of a public research institution implies a governmental non-profit making institution with defined activities in the sense of public service. In frame of its registered activity the Institute carries out the following tasks: (a) basic, applied and developmental research in the area of agriculture and food; (b) expert projects defined by laws, (c) advising, studies and laboratory service; (c) supervision and verification of quality of agricultural products and products used for agriculture; (d) publication of findings and results of research, expert and control work. The prevailing part of the research and expert work is done in modern equipped laboratories and in experimental fields and plantations. The breeding work is focussed on traditional Slovene products: potato, grasses, clovers and vegetables, among which there are several registered varieties owned by the Institute.

Institute for Hop Growing and the Brewing Industry in Žalec (www.ihps.si) is a research, developmental, advisory and educational public organization. It is acting for the needs of various governmental bodies as well as for the needs of home and foreign agribusiness industry. Its principal functions are research and advisory service in the fields of industrial plants growing i.e. hop breeding, agricultural technology, plant physiology, nutrition, hop marketing, protection of hops against diseases and pests and the related prognosis, as well as

the application of chemical solutions used for the protection of plants, rural development, and ICT information management in agribusiness.

The Institute for Mediterranean Agriculture and Olive Growing (http://www.zrs.upr.si/en/Institutes/Institute+for+Mediterranean+Agriculture+and+Olive+Growing) principally focuses on studies of chemical and sensory characteristics of olives and olive oil cultivated and produced in Slovenian Istria, as well as morphological and genetic characteristics and peculiarities of olive cultivars from this area. Moreover, the Institute examines and monitors olive oil quality. The Institute also strives to excite the recognizability of the protected designation of origin (PDO) of olive oils originating from Slovenian Istria, to promote Slovenian olive oils at home and abroad, and to preserve traditional olive groves and olive varieties as important elements of natural and cultural heritage of this area.

Emona RCP – Nutrition Research and Development, Ljubljana (http://www.e-rcp.si/o_podjetju_angla.html) is a R&D unit of the enterprise Jata Emona and is involved in various R&D projects in the area of human and animal nutrition. Main goal in field of Human nutrition is development of functional food, semi-products and components for food supplements. In field of animal nutrition researching physiological needs of animals, quality of feed and adequate supply of nutritious substances. . Its main domestic/international R&D projects include EUREKA project 'Influence of Animal Diet on Fatty Acid Composition of Pork', PHARE project on production of functional foods, R&D project on bioavailability of Ca and P as well as a series of projects on the traceability of different meats (pork, beef, poultry) and eggs.

The Chamber of Commerce Slovenia, **Chamber of Agricultural and Food Enterprises** is the legal successor of the Association of Slovenian food industry. Acting as a members' representative in a business environment is a voluntary, independent and non-profit organization of companies and entrepreneurs in the business of production and processing of agricultural and food products. It operates within the Slovenian Chamber of Commerce. Its program of work defines the tasks and priorities.

The main mission of the **Competency Centre for Biotechnological Development and Innovation** (http://www.kc-brin.si/en/) is to achieve synergistic effects through connecting the scientific and research excellence and the infrastructure of leading Slovenian research institutions with technologically advanced and highly innovative representatives of Slovenian business in joint market-oriented R&D projects. The Competency Centre combines research in the field of functional food and dietary supplements, probiotic microbial strains and industrial microorganisms used in the production of various active ingredients. The Competency Centre is organised as a consortium of companies and research organisations and the non-profit Institute of Biotechnological Innovation, which is responsible for the development and management of the Competence centre. The Institute is managed by the Institute's Board, which is composed of representatives of all members of the consortium. This ensures strong integration of the management skills of the business partners and the research skills of the academic institutions and research organisations.

Policy framework, programme and measures in support of food innovation

Research and Innovation Governance

National policies exclusively promoting food industry R&D and innovativeness have not been implemented in Slovenia. However, since the mid 1990's different policy documents have repeatedly regarded life sciences, biotechnology and pharmaceutical research as scientific fields which are to be promoted with priority. Therefore, no direct emphasis on agro-food research, however, there are some measures which are partially. Ministry of Education, Science, Culture and Sport and Ministry of Economic Development and Technology are responsible for the preparation of the policy documents in the R&D area, for implementation of R&D policy (i.e. implementation of the National Research and Development Programme – RISS), the public R&D budget and international cooperation in the area of R&D. For the execution of R&D and innovation policy, two special public agencies have been established: Slovenian Research Agency (SRA) and Slovenian Technology Agency (TIA). The first is responsible for the execution of public research financing, for the professional and independent selection/evaluation process of projects and programmes and the monitoring of research programmes and projects implementation. The TIA is in charge of programmes promoting technology development and of business R&D co-financing. Until the recent economic crisis Slovenia performed quite well in the field of investments in R&D. In the year 2010 the share of Gross domestic expenditure on R&D (GERD) was 2,1% of GDP or 745,9 million EUR. There was a continuous increase of investments in R&D in the last years, since in 2008 the GERD in Slovenia amounted to 1,66% of GDP and in in 2009 the value increased to 1,86% (SORS, 2011). Nevertheless, the Slovene Government, before the beginning of the current crisis started, announced that the Barcelona target of 3% of GDP for R&D will not be reached by 2010 and the new date was settled for 2013. In the current situation, it is quite realistic to announce that also 2013 is an unrealistic target date and it should be postponed to 2015 or even later. The highest share of the GERD in 2010 was contributed by companies (435,5 million EUR), which represented 58% of total sources of funding R&D. Compared with the previous year, the share of these funds remained the same.

Public Research

The public R&D funding in Slovenia is structured under the following the institutional scheme: Slovenian Research Agency is in charge of financing basics and applied research primarily in public research sector, while Technology and Innovation Agency should be financing the R&D activity in business sector or in projects where both public and private R&D institutions are involved. In addition, resources of the Ministry of Economy and Technology are provided through Public Agency for Entrepreneurship and Foreign Investment for measures supporting the mobility of researchers and the running of intermediary institutions (technology parks, university incubators, etc.) and through Slovenian Enterprise Fund for start-ups in innovation environment and bank guarantees for SMEs engaged in R&D projects and technological restructuring. Slovenia's innovation performance is varied. Some innovation inputs, notably R&D expenditure and the number of researchers per million inhabitants, are broadly on par with or even high relative to Slovenia's GDP per capita.

Table 1- Total intramural R&D expenditure (GERD) *(Source: Eurostat, 2012)*

	2008	**2009**	**2010**	**EU average 2010**
GERD as % of GDP	1,65	1,86	2,11	2,0
GERD per capita	307	323	364	490

In the past decade, Slovenia has established a complex scheme of bridging institutions within the national innovation system to help bridge the gap between public research and industry. The measures and instruments were mostly copied from more developed countries or suggested to the government by various consultancies. The bridging institutions include technology parks and centres; incubators, clusters, technology networks, technology platforms and centres of excellence. There are also different business information units such as the small business development centres, innovation relay centres, Euro-Info-Centres, regional development agencies, the Slovene Enterprise Fund, etc. All of them share the ambition of the policy makers to establish as complete an innovation system as possible.

One of the resource mobilisation strong points/advantages in Slovenia has been the growth of business R&D investment. Within aggregate R&D, the business sector's contribution gained in importance in recent years, at least until the onset of the crisis in 2008. At nearly 60% in 2007 and 63% in 2008 (Eurostat, 2010) business funding of R&D far exceeded the EU27 average of 55% and is thus in a range typical of more advanced innovation systems. However, the private sector's share of GERD is still the highest of the 12 new EU member states.

Further growth depends on the enterprises currently inactive in R&D and innovation: their involvement in R&D needs to be promoted along with sufficient increase of the absorption capacity for new knowledge/technology.

6.2 KEY POINTS FROM THE SWOT/ SOR ANALYSIS AND POLICY RECOMMENDATIONS REPORT

The SWOT/SOR analysis - from the profiling of SMEs and RTD players has highlighted some key points useful to plan and propose a set of recommendation for the formulation of policies, programmes and measures able to sustain innovation in Slovenia.

Based on the SOR matrix for SMEs, the following observations can be made:

- The food sector should take advantage of proper strengths as product and process quality as well as financial capacity in order to use all the export possibilities which are available.
- Same strength, together with product market positioning, should be used in order to deal with all the threats identified.
- The food sector is dealing with several weaknesses, which all together makes impossible to reach the opportunities available; we can't say one weakness is explicitly in front of the others.
- The food sector should mainly focus on poor networking with public actors in order to deal with the main threats, being insufficient incentives addressed to the sector and nonexistence of political long-term commitment to the sector.

Based on the SOR matrix for RTDs, the following observations can be made:

- RTDs seems to be in a good position to grasp the opportunities which are available, mainly using the existing open exchange of experiences and research for successful networking with all the other stakeholders, dealing with R&D.

- Increasing number of collaboration activities with food companies should be also used in order to deal with the existing threats of external environment, namely no jobs available for university researchers and brain drain.
- In order to be successful in reaching available R&D funds and establishing development centers RTD should focus and take care of its weaknesses, being poor linkage between them and food companies, as well as weak understanding between researchers and industry, which complicates joint projects.
- Poor linkage between food companies and research entities should be also taken into consideration in dealing with the threats, where no jobs for university researchers and brain drain are again in the front.

The SOR analysis, which is focused on food industry, showed that food industry has great export possibilities due to the position of the country, which needs to be well used. Slovenian products are known for their quality, so food industry should promote their quality in the country and beyond the country's borders.

Due to the increasing competition in the market, Slovene Food industry could succeed with advanced, innovative, quality products and services. The food sector should take advantage of proper strengths as product and process quality especially because there is increasing consumer demand for more/better varieties.

Food industry has a lot of opportunities as well as some strengths – Slovenian policy should foster this strengths and with long term commitment take care of sufficient support for this strategic industry.

In order to be successful in reaching available R&D funds and establishing development centres RTD should focus and take care of its weaknesses, being poor linkage between them and food companies, as well as weak understanding between researchers and industry, which complicates joint projects. This also have influence on development of new innovations and products. Slovenia should foster innovation in food industry – in their documents and with founds - that will help and foster RTD institutes to have more firm connections with food industry (flow of information, knowledge, experts). Collaboration between food industry and RTDs will help to transfer the knowledge from theory to practice.

Slovenian politics should establish existence of political long-term commitment to the sector of food industry – because of its strategic role (food security – self sufficient supply).

6.3 DESCRIPTION OF KEY MEASURES

These recommendations arose from the results of SWOT analysis and SOR and have been thought to be realistically adopted in the national context.

Name of the measure	Supporting investment for restructuring and adjustment to the standards
Region	Slovenia
Timeframe	Medium term (2 – 5 years)
Rationale	The major challenge for the food sector will be to adjust the products and services to both a changing environment and consumer needs. And this means food industry needs not only incentives but also support for investments in research programs, technology, and technological process. *http://europa.eu/rapid/press-release_SPEECH-07-229_en.htm?locale=en* Investments in agro-industries are known to have significant multiplier effects through both their backward and forward linkages along the value chains. *http://www.fao.org/docrep/015/i2420e/i2420e01.pdf* To spur rural development and food security, both the theory and practice of development economics has traditionally focused on increasing agricultural productivity on the farm. More recently, development practitioners and policy-makers have broadened their attention to include agro-industries – and this bring also need to support the development of food – industry with supporting investment and simplifying (less time consuming procedures) the some administrative regulations.
Particular sector and subsector	Agriculture, Food Processing, Food Industry, Biotechnology
Objectives	➢ Funding innovative industries (grants, loans, guarantees, equity, etc.); ➢ Dedication of responsible authorities to less time consuming procedures for (some) administrative regulations regarding the food industry (new products etc.)
Core activities	The policy should address SMEs to facilitate the financing of innovative projects - incentive to apply research to discover/improve new methodologies or create new processes and/or products. With different financial mechanisms should be supported investments in new/different technologies that would meet the new standards and quality that are required from customers and are obligatory because of standards in food-industry.
Implementing entity	Ministry of agriculture, forestry and food, Chamber of Commerce and industry of Slovenia, Food processing industry
Financial resources	The funding could be from the ERDF- Rotation fund (target value - 3% annual growth), EU's Seventh Research Framework Programme (FP7)
Target groups	Small, medium and large Food SMEs
Indicators for implementation success	Revenue from the sale in €

Name of the measure	Supporting development of competitive facilities and new products
Region	Slovenia
Timeframe	Medium term (2 – 5 years)
Rationale	The food industry is Slovenia leading manufacturing sector in terms of turnover, employment and number of companies, but the industry spends far less in research than other countries. This is mainly due to the fact that Slovenian food companies are mostly SMEs which cannot devote extensive time or resources to often lengthy research processes.
Particular sector and subsector	Agriculture, Food Processing, Food Industry, Biotechnology
Objectives	➢ To enhance the support of competitive food-industry (SMS's) in Slovenia is to involve new indicatives (grants, loans, guarantees, equity, etc) for innovative projects (new products and technologies that will meet the customers – specific – needs with competitive product process). ➢ The other objective is as important as the first one – as there is not enough researchers in food-industry some new measures for strengthen the cooperation between researchers/institutes and food-industry should be applied. ➢ With supporting innovative projects and with involving researchers and knowledge from different sectors, it would be reachable also the third objective and that is more (high) quality food products in the market.
Core activities	The main activity should be represented by implementing new incentives for investments in innovative production process (new technology, new product process) with strong connections (obligation) of including researchers in the innovation process. There should be also more incentives in the field of knowledge transfer from different sectors – not only the food sector, but also in processing, hum an recourses, medicine, engineering,..
Implementing entity	Chamber of Commerce and industry of Slovenia, Food processing industry, Biotechnical faculty
Financial resources	Funds for supporting innovations (all kind of funds – as PF7, multinational and bilateral programs, funds for Universities, national and other EU funds)
Target groups	Food SMEs, Research entities
Indicators for implementation success	Number of new innovative process and products (declared and also "alive" after the end of supporting/project period).

Name of the measure	Introduction system to promote innovation in food-industry
Region	Slovenia
Timeframe	Medium term (2 – 5 years)
Rationale	Innovation is considered to be essential to the long term survival and profitability of food and drink companies in the current highly competitive environment. Companies need to proactively develop new products and processes to meet the changing demands of consumers. The existing professional assets of high skills in research could represent a real resource for agro food system in Slovenia, to strengthen SMEs and support their innovation processes, but this assets seems to be confined to the research environment and framework, with evident difficulties to transmit advances in research useful for industry.
Particular sector and subsector	Agriculture, Food Processing, Food Industry, Biotechnology
Objectives	➢ to improve technological ability to innovate at national level ➢ to accelerate the innovation culture and behaviour in SMEs and RTD entities
Core activities	Provision of training services to acquire skills and tools to improve innovation processes, project management, technology transfer, creation of a web platform to exchange contents, experiences, sharing projects and skills
Implementing entity	Ministry of agriculture, forestry and food, Chamber of Commerce and industry of Slovenia, Food processing industry
Financial resources	The funding could be included from the ERDF- Rotation fund.
Target groups	Food SMEs, Research entities, consultants
Indicators for implementation success	Number of innovations in particularly SMS's.

Name of the measure	The development of network to enable the knowledge transfer - from institutions to the SMS's
Region	Slovenia
Timeframe	Medium term (2 – 5 years)
Rationale	The agro-food industry is faces with the challenge of creating innovation and developing value-added food products, (including functional foods), in addition to those classified as food for specific nutritional purposes. In the same way, the research entities, thanks to the progress in life and nutritional sciences, can and will increasingly provide significant insights to understanding the mechanisms which underpin the physiological functionality of food components. Effective research-industry partnership are imperative and will offer benefits to the consumers through more personalized nutritional advices for high-risk groups and health claims based on sound scientific evidence. To this end, it is necessary to strengthen the research infrastructures, to boost RTD investments, to improve cooperation networks' and to enhance technology transfer.
Particular sector and subsector	Agriculture, Food Processing, Food Industry, Biotechnology
Objectives	➢ to develop operative network of RTD institutes and companies (SMS) and create an active context in which players share objectives with definite goals ➢ to develop sustainable (not temporary) network which could also function through some projects finance but not only as a short term network ➢ to promote networking through different actions and media
Core activities	Supporting services for establishment and function of such networks (advisory, technology transfer and training), developing incentives for developing (national and international) innovation projects, to include SMS and other subjects in whole food chain in different action with purpose to join or create a network along the food-chain producers and RTD's.
Implementing entity	Ministry of agriculture, forestry and food, Food processing industry, RTDs, consultants
Financial resources	ERDF, PF, other sources also private
Target groups	Food SMEs, RTD's
Indicators for implementation success	➢ Number of new technologies realized through the incentives and network ➢ Number of new proposals for joint collaboration (through incentives or projects)

Name of the measure	Establishment of agro-food chains (market collaboration)
Region	Slovenia
Timeframe	Medium term (2 – 5 years)
Rationale	The aim is to establish agro-food chains in which they would connect all actors in the supply chain (from farmers, SMEs, RTDs). The cooperation between the actors is necessary for more competitive productive system.
Particular sector and subsector	Agriculture, Food Processing, Food Industry, Biotechnology
Objectives	➢ Support for the joint production or marketing of long-term cooperation between the members of the chain. ➢ Establishment of short supply chains.
Core activities	Long-term cooperation between the members of the chain
Implementing entity	Ministry of agriculture, forestry and food, Chamber of Commerce and industry of Slovenia, Food processing industry, Chamber of Agriculture and Forestry of Slovenia
Financial resources	The funding could from the ERDF- Rotation fund
Target groups	Farmers, Food SMEs, consumer associations, media
Indicators for implementation success	Long-term cooperation between members of the food supply chain

Name of the measure	Strengthening RTDs – SMEs cooperation
Region	Slovenia
Timeframe	Long term (5 - 7 years)
Rationale	The aim is to establish development programs through strategic directions to encourage cooperation. The cooperation between SMEs and RTDs is necessary for more competitive productive system. Lack of the resources is often difficulty that SMEs cannot investment in research and development.
Particular sector and subsector	Agriculture, Food Processing, SMEs, RTDs, Biotechnology
Objectives	➢ To stimulate research cooperation between RTDs and SMEs. ➢ To avoid temporary actions or networking dedicated to single or few projects (long term collaboration between stakeholders). ➢ To realize a strong commitment of SMEs and RTDs in joint projects.
Core activities	Ensuring of innovation support services (technology transfer, consulting).
Implementing entity	Ministry of agriculture, forestry and food, Chamber of Commerce and industry of Slovenia, Food processing industry, Chamber of Agriculture and Forestry of Slovenia
Financial resources	The funding could from the ERDF- Rotation fund
Target groups	Food SMEs, RTDs, consumer associations, special target groups, regional authorities, investors, consultants.
Indicators for implementation success	No. of services requested and used by networks participants No. of new joint proposals presented No. of common projects

7. REGION OF CENTRAL HUNGARY

7.1 DESCRIPTION OF THE REGIONAL CURRENT STATE OF PLAY

The formation of the single European market created not only opportunities, but also difficulties for the Hungarian players regarding more and more strict regulations, that the actors in the agro-alimentary sector has to regard as guidelines, and in several cases burdens as well. The SMEs in the business of food production has to fulfil strict food safety requirements in a rapidly increasing extent, which requires the implication of a permanent innovation and development process from all market players. Moreover, difficulties not only arisen in the field of national and European level regulations, but they also have to restrict themselves due to their resource constrains. In Hungary the agri-food sector had to face a suddenly increased competition especially after the EU accession. There are factors which relate to the innovation capacity of the firms and explain the differences among them and also some of these components play significant role in market development too.

During the last two decades the Hungarian agri-food sector therefore had to face dramatic changes in its competitive environment. In addition the shock of the transition process from the Communism to the free market economy of the so called western model of capitalism, retail revolution has evolved much faster than in Western European countries. Structural change in retailing, processing and farming, together with growing market saturation and increasing consumers' concerns regarding product and process quality, have had strong influence not only on the organization and structures, but also on the generation of profits along the food chain. Moreover, the agri-food sector had to face a suddenly increased competition especially after the EU enlargement in 2004. As a results of these pressures, agri-food chain, which is generally assumed as mature and relatively low technology sector has been forced to introduce changes affecting all aspects of operation. The only chance for them to overcome the stress of the recent economic crisis is if they explore their innovation capacities through their improved networking activities market. Tiny farms and households produced abundant livestock and orchard products without any market coordination. However, privatisation meant an increasingly dispersed production structure, and the subsequent rapid decline in domestic food processing and retailing, coupled with the advent and influence of multinational companies, created almost insurmountable adjustment challenges. Between 2004 and 2006, over **200 thousand livestock farmers abandoned production**.

As regards the socio-economic development of Hungary, significant disparities evolved between the many different parts of the country, which were influenced by the different natural endowments of various areas as well as by historical effects. The most developed part of Hungary is the region of Central Hungary, including Budapest, the capital. Western areas are usually more developed than the eastern regions, and a north-south split can also be detected.

These disparities are apparent in settlement structure, demographic trends, the state of economic development and circumstances of life.

Central Hungary is the part of the country with the smallest area but with the highest population, where 29% of the population is concentrated.
In the remaining six regions the distribution of the population is more even (9–15%) but inhabitants live in essentially differing settlement conditions. In the settlement structure of the regions of Transdanubia and Northern Hungary there are typically small villages with less than 1,000 inhabitants. The two regions in the Great Plain consist of settlements with long boundaries and larger population, where settlement density is considerably lower than in other areas of the country. Following Central Hungary the share of urban population is the highest in the regions of the Great Plain (68%–72%), although this level of urbanisation is still coupled with a relatively high number of inhabitants living in farmsteads, which is mainly characteristic of Bács-Kiskun, Csongrád and Békés counties in Southern Great Plain (9%).

7.2 KEY POINTS FROM THE SWOT/ SOR ANALYSIS AND POLICY RECOMMENDATIONS REPORT

Analysis of Central Hungary Region regarding Innovation

The limited innovation capacity (efforts, activities and results) of the individual small and medium sized enterprises means limited resource for the companies. The firms are necessarily different from each other in the sense that they put different emphasis on the different components of this resource. However, the complex effect of these effort, managerial routines and activities result in heterogeneous innovation capacity.

If the innovation capacity of a firm is a real economic resource, the extent of efficient use of this resource contribute in positive or negative way to the market realization of the firms' product and services.

The SMEs are surrounded by an extremely challenging business environment, where they are pressed both by the suppliers and consumers to innovate. Regarding that their innovation capacity is very much limited; they can utilize this specific economic resource in an efficient way only if they cooperate with other business players.

According to the survey, carried out in order to analyse the innovation factors which explains the differences between the companies, of the Central Hungarian Region, we can create an order:

1. The most important factor is the knowledge accumulation
2. The second is the product innovation

3. Anticipated innovation advantages
4. Technological innovation
5. Organizational innovation
6. Innovation environment

Interesting factor is that it is only the knowledge accumulation factor, the anticipated innovation advantages and the innovation environment which contributes significantly and positively in the influencing of the revenue of each company.

Challenges:

Even though that the SMEs in Hungary have a similar small-scale structure as the EU-average, the contribution of Hungarian SMEs to the overall economy as measured by the added value is – in EU-terms – significantly lower, 50 % vs. 58 % in the EU.

We can say that:

- The lack of financial resources for innovation and the shortage of innovation management capabilities Hungarian SMEs are significantly less innovative than the EU average
- The innovation capacity of the Hungarian SMEs is also very limited because of the available resources.
- Food safety requirements in a rapidly increasing extent creates new challenges day by day
- That drives the SMEs to a continuous innovation constraint and development process from all market players who are involved in the food chain.

It is widely recognised that knowledge accumulation and coordination as base of innovative solutions for the production and technological processes can play decisive role in keeping the firms in competitive position.

- The challenge of the transition process in 1990, the retail revolution has evolved much faster than in Western European countries. Structural change in retailing, processing and farming, together with growing market saturation
- Increasing consumers' concerns regarding product and process quality
- Therefore SMEs had to face a strong fall back in the profit generating
- Moreover, the agrofood sector had to face a suddenly increased competition especially after the EU enlargement in 2004.
- The companies dare to make only short term plan because of frequently changing
- Significant presence of black economy
- Despite growing import, the balance of trade regarding agricultural products is positive – partly because of processing imported raw materials. At the same time, the added value of exported agricultural and food products is becoming lower and lower. There is a tendency to export mainly agricultural raw materials or agricultural products and food products following primary processing. In 2010 the following shares in revenues were reported by the AKI agricultural report within the food industry: raw materials 42%, primary processing 19% and highly processed products 39%. Raw materials had a

share of 74% while finished products had a share of 19% in the positive balance of agricultural trade.

As a results of these pressures, agrofood chain, which is generally assumed as mature and relatively low technology sector has been forced to introduce changes affecting all aspects of operation. The only chance for them to overcome the stress of the recent economic crisis is if they explore their innovation capacities through their improved networking activities

Objectives:

- to acquire a stable market for products of the Hungarian food industry both internationally and within the country
- domestic needs should be fulfilled by the Hungarian food industry to the highest extent
- to increase the export of Hungarian food products belonging to the premium category
- the food industry should provide employment and living for as many people as possible
- to provide resources for enterprises by encouraging tailor-made financing constructions
- to focus on developments that increase added value: the production of high quality products should be a priority instead of mass production
- structural changes - concentration and specialization - should be encouraged in the specific sectors
- to create and develop chains of cooperation: encourage cooperation between the market players and the creation of integrated product path systems
- to encourage research and development in order to produce products of higher quality
- specialized food industrial education should be fitted to the needs of the sector on every level
- to inform/educate consumers about food, increase consumer awareness.

Policy recommendations

- The companies' research and development activities should be expanded
- Internationally recognized research & development-, innovation centres and research universities should be subsidised and/or established
- The capacity of certain regions for R&D and innovation should be established
- A knowledge market which works on the principles of performance recognition and competition through the globalization of knowledge production and dissemination should be created
- Investing in large scientific facilities, primarily in the regional centres and the development poles, reducing regional differences strengthening regional cohesion
- Dynamic increase in the yearly R&D expenditure
- Intellectual and financial resources should be in the focus, optimization of utilization.
- Increased economic and societal implementation of R&D results should be carried out.
- Strengthening of regional innovation is a must
- Strengthening the culture of acceptance and utilizing of the scientific research results.

- Quality-, performance-, and utilization-driven efficient national innovation system shell be encouraged.
- Well-honoured creative and innovative workforce suitable for the demands of knowledge-based economy and society should be encouraged and financially supported
- Supporting economic and legal environment with incentives for creation and utilization of knowledge
- Domestic companies, products and services that are competitive on the global market should have more emphasizes.

7.3 DESCRIPTION OF KEY MEASURES

Name of the measure	BioAgroFood Cluster
Region	*Central Hungarian Region (Hungary)*
Timeframe	Medium Term (2- 5 years)
Rationale	Changing attitudes and behaviour in society and new and emerging consumer trends necessitate constant renewal of food products, customization of nutrition for population groups (elderly, diabetics, pregnant, babies, athletes, etc.) and the introduction of innovation in food production. Food innovation is not clearly understood and appreciated by the public and certain critical groups in Hungary. Facilitation of innovation and entrepreneurship are the most demanded 'skill' today in the food market in Hungary to enhance the framework conditions and pave the way to innovation. Objectives are to set up the appropriate mechanisms that will facilitate the exchange and coordination of research, technology and innovation approaches and policies for the Food Sector and to increase the public awareness on the importance of technological progress and innovation, therefore European Food Chain Parliament, Foodlawment is committed: • to enhance food chain safety and the protection of human/animal/plant health and the environment and food innovation in the Euro-Atlantic region with collecting and disseminating truthful and authentic information
Particular sector and subsector	Agriculture, Food Processing, Food Industry
Objectives	to acquire a stable market for products of the Hungarian food industry both internationally and within the country domestic needs should be fulfilled by the Hungarian food industry to the highest extent to increase the export of Hungarian food products belonging to the premium category the food industry should provide employment and living for as many people as possible to provide resources for enterprises by encouraging tailor-made financing constructions to focus on developments that increase added value: the production of high quality products should be a priority instead of mass production structural changes - concentration and specialization - should be encouraged in the specific sectors to create and develop chains of cooperation: encourage cooperation between the market players and the creation of integrated product path systems to encourage research and development in order to produce products of higher quality specialized food industrial education should be fitted to the needs of the sector on every level to inform/educate consumers about food, increase consumer awareness.
Core activities	1. Collecting and publishing authentic and scientifically based information online

	2. Establish and keep up forums on our Website to stimulate direct knowledge transfer and constructive discussions for all interested parties through the food chain 3. Organizing conferences, workshops, forums and seminars to achieve and maintain a direct and effective communication between consumers, manufacturers, retailers, researchers, governments and policy makers 4. Encourage propagation and education for all generation of consumers and the industry on protection of environment, animals, nature and consumer
Implementing entity	European Food Chain Parliament, Foodlawment
Financial resources	
Target groups	Food SMEs, research entities, consumer associations, special target groups, regional authorities, investors, consultants, media, etc.
Indicators for implementation success	- Auditable media activity - Number of entities participating -

8. SUMMARY AND ANALYSIS OF MEASURES

In this section we will collect and analyse the particular food innovation support policy measures proposed in each region/ country in order to synthesise the ideas and a) reach to useful conclusions about their typology and b) define integrated measures that could be applied at the level of future South- East- Europe transnational cooperation programmes.

Regional innovation policy instruments may target **knowledge generation, diffusion or exploitation**, or several of those objectives simultaneously. Knowledge generation includes the specific incentives and regulations for the production of scientific and technological knowledge, including mechanisms to attract talent, and specific incentives for supporting R&D activities in firms. In general, regional action tends to **focus on instruments supporting knowledge diffusion, taking agglomeration effects and proximity into consideration**. These first two categories include mostly linear and supply-side instruments. Many regions are also active in knowledge exploitation, which includes measures directed towards the demand side of innovation, in support of the application of existing knowledge in production. Technological extension services, business development support and human capital development are some of the traditional mechanisms used to encourage innovative business practices. A **typical taxonomy** of knowledge generation, diffusion or exploitation innovation policy measures is presented below:

	Knowledge generation	Knowledge diffusion	Knowledge exploitation
Traditional instruments	Technology funds, R&D incentives/supports/grants Support for scientific research and technology centres Support for infrastructure development Human capital for S&T	Science parks Technology transfer offices and programmes Technology brokers Mobility schemes, talent attraction schemes Innovation awards	Incubators Start-up support Innovation services (business support and coaching) Training and raising awareness for innovation
Emerging instruments	Public-private partnerships for innovation Research networks/poles	Innovation vouchers Certifications/accreditations	Industrial PhDs Support for creativity and design Innovation benchmarking
	Competitiveness poles Competence centres New generation of scientific and technological parks and clusters Venture and seed capital Guarantee schemes for financing innovation		
Experimental instruments	Cross-border research centres	Open source-open science markets for knowledge	Regional industrial policy Innovation-oriented public procurement

Source: Nauwelaers, C. and A. Primi (forthcoming), *Innovation Policy and Regions: Policy Spaces, Strategies and Challenges*, Regional Development Working Papers, OECD Publishing, Paris.

Table 6: Regional innovation policy instruments, Source: 'Regions and Innovation Policy', OECD, 2011

Below a full list of the food innovation measures suggested in each region is presented with the appropriate taxonomy (knowledge generation, diffusion or exploitation) to match the various needs for research and innovation.

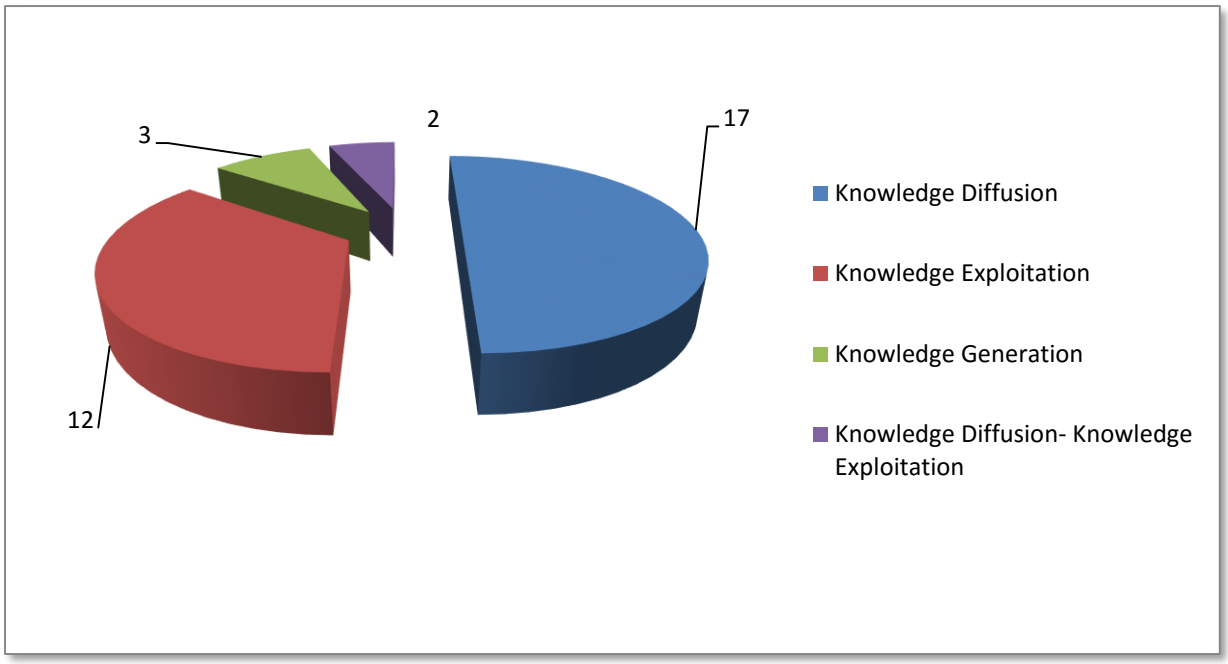
Region/ Country	Measure	Type	Target groups
Region of Central Macedonia- Greece	BioAgroFood Cluster	Diffusion	SME, RTD entities, other actors
	Standardisation and upgrade of local agrofood products	Exploitation	Farmers, SMEs, RTD entities, other actors
	Support of research cooperation projects	Generation	SME, RTD entities, other actors
	Innovation Vouchers	Diffusion-Exploitation	SME, RTD entities, other actors
	Mobility schemes for researchers to agrofood companies	Diffusion	SME, RTD entities, other actors
	Support in the development of analytical laboratories and related services	Diffusion-Exploitation	SMEs, research entities, clusters
	Financial measures for the development of spin- offs and start-ups for the agrofood sector	Exploitation	Researchers , technicians
	Enhancing the cooperation of the primary agricultural sector and the manufacturing food sector	Exploitation	Farmers, SMEs, other actors
	Updating the academic curricula of academic studies to match current agrofood needs	Diffusion	Academia, students
Region of Apulia- Italy	Strengthening public-private cooperation	Diffusion	SME, RTD entities, other actors
	Improving awareness and knowledge on innovation and competitiveness	Diffusion	Researchers , technicians, SMEs, other actors
	Bridging knowledge from R&D system to SMEs	Diffusion	SME, RTD entities, other actors
	New incentives for researchers for cooperation with SMEs	Diffusion	SME, RTD entities, other actors
	Updating academic curricula to match current food innovation trends	Diffusion	Academia, students
	Improving skills for innovation management in SMEs	Exploitation	SMEs
	Favoring the creation of R&D department in SMEs	Exploitation	SMEs
	Funding SMES for adopting innovative technologies, also by patent applications	Diffusion	SME, RTD entities, other actors
	Bureaucracy simplification (times and rules) and more efficient project administration	Diffusion	Regional and national authorities
	Promoting a demand-driven knowledge transfer approach for Mediterranean Food Products	Diffusion	SME, RTD entities, other actors
Region of Pazardjik, Bulgaria	Clusters in sectors with high development potential, incl. the food sector	Diffusion	SME, RTD entities, other actors
	Modernisation of R&D infrastructure and improvement of the capacity of RTD entities to apply research results	Exploitation	RTD entities

Region/ Country	Measure	Type	Target groups
	Improvement of the capacity of RTD personnel to apply research results	Exploitation	Academia, students
Romania	Increasing the industrial skills in transfering technology and research results	Diffusion	SMEs
	Increasing the marketing skills of researchers or R&D units staff for valorising of research results	Exploitation	Researchers
	Increasing the dialogue between research and industry	Diffusion	SME, RTD entities, other actors
	Updating academic curricula to match current food innovation trends	Diffusion	Academia, students
	Applying innovative and new technologies to perform research (biotech, ICT, etc.)	Exploitation	SME, RTD entities, other actors
	Developing R&D projects on food security	Generation	SME, RTD entities, other actors
Slovenia	Supporting investment for restructuring and adjustment to the standards	Exploitation	SMEs
	Supporting development of competitive facilities and new products	Exploitation	SME, RTD entities, other actors
	Introduction system to promote innovation in food-industry	Diffusion	SME, RTD entities, other actors
	The development of network to enable the knowledge transfer - from institutions to the SMS's	Diffusion	SME, RTD entities, other actors
	Establishment of agro-food chains (market collaboration)	Exploitation	Farmers, SME, RTD entities, other actors
	Strengthening RTDs – SMEs cooperation	Generation	SME, RTD entities, other actors
Hungary	BioAgroFood Cluster	Diffusion	SME, RTD entities, other actors

The majority of proposed measures refer to **Knowledge Diffusion**, followed by **Knowledge Exploitation** and **Knowledge Generation**. Two measures were also identified to bridge Diffusion and Exploitation. It can be observed that the typology of selected measures matches common characteristics in the Inno- Food SEE regions such as:

- The general lack of awareness of SMEs about food innovation potential which highlights the need for Knowledge Diffusion,
- A practical approach to problem solving in the food industry which highlights the need for Knowledge Exploitation,
- An understanding of the potential offered by cooperating with all members of the agrofood value chain; clustering appears as a commonly used tool for cooperation and synergies development;

- Knowledge generation can be more appropriately dealt by national and European funds, as regional funding for innovation is limited.



The analysis of the target groups of the proposed measures shows that **the majority of actions involve SMEs**, either exclusively but in the majority of cases in combination with research entities and other actors such as accreditation and standardization bodies, support services, funding institutions, consumer associations, technology consultants, etc.

A significant number of actions also involve **farmers and their associations**, a fact which highlights the understanding of an integrated approach to the entire agrofood chain. This is particularly important for regions which have a limited agricultural production and face fierce competition from cheaper raw material imports; also for regions with products of a particular character (PDOs) that requires support in terms of branding and marketing.

Finally, many activities relate to **upgrading Human Resources** for the agrofood sector; in particular activities related to a) upgrading of academic curricula, b) training and coaching of SMEs personnel in innovation management, c) industrial PhDs, etc.

9. TRANSNATIONAL SEE ACTIVITIES

According to the Application Form in the framework of D4.2- Operational Plans for food RTD and innovation the Inno- Food SEE partners would propose the inclusion of measures that enable synergies and common activities of a transnational SEE character. Such measures could be appropriately funded by future transnational cooperation and European financial instruments such as the successor of the SEE Programme or Horizon 2020. Such activities are listed in the table below:

Name of the measure	Inno- Food SEE Cluster
Rationale	Food innovation in the participating SEE countries share similar challenges. SMEs and RTD entities could benefit from enhanced geographical cooperation, sharing of knowledge and resources, common branding and marketing of food products, etc.
Objectives	• To facilitate the cooperation of food SMEs and RTD entities at a SEE level • To commonly exploit resources and infrastructure at a SEE level • To enable the development of a common 'SEE food brand'
Core activities	- Access to common research infrastructure - Small scale innovation projects to valorize and highlight the value of common traditional food products - Innovation and technology transfer support to enterprises/ SMEs - Training workshops for entrepreneurs and researchers on food innovation and innovation management - Common marketing and branding - Exchange of research and technical personnel - Development of market surveys and foresights - Common information campaigns to create consumer awareness on local products - Internationalisation activities
Financial resources	Future transnational cooperation and European financial instruments such as the successor of the SEE Programme or Horizon 2020
Target groups	SMEs, RTD entities, support organizations, consumers

Name of the measure	Updating the academic curricula of academic studies to match current agrofood needs
Rationale	Agricultural and food production necessitate new skills, techniques and knowledge in order to constantly produce products that are up- to- date with the market and consumer needs. Universities, technical schools, etc. should be able to provide these new skills and provide opportunities for practice in agricultural and food production.
Objectives	➢ To provide skills that match the agricultural and food production needs ➢ To provide graduates with increased opportunities for acquiring relevant jobs in the sector ➢ To support the transformation of the agricultural and food production from a labour- intensive to a knowledge- intensive industry
Core activities	Academics, researchers, industry representatives, innovation experts, consultants, etc. work together, perform a trends and needs analysis towards the development of updated academic curricula on relevant domains such as: - Food technology studies - Biotechnology and genomics - Veterinary and horticultural studies - Chemistry, Physics, Engineering - Management, Marketing, Economics, etc.
Financial resources	The successor of the SEE Programme, Erasmus+, etc.
Target groups	Academics, researchers, industry representatives, innovation experts, consultants, etc. Final beneficiaries of the activities are students.

Name of the measure	Advanced training for researchers on food innovation and technology
Rationale	Researchers from RTD entities of the SEE area can benefit from advanced training and exchanges with a particular focus to the sgrofood sector

Objectives	• Create professional and qualified research profiles, with particular regard to the following areas:
	  ○ Agricultural Science and Technology
	  ○ Biotechnology
	  ○ Medicine (for aspects connected to human health)
	  ○ Food science and technology
	  ○ Genetic science and technologies
	• Create real job opportunities and provide the possibility to manage innovative processes in companies/ SMEs

Core activities	Short- to- medium term transnational exchange of researchers. The hosting organisations will provide hands- on training on various innovative analytical techniques, industrial research activities, management of innovation, etc.
Financial resources	The successor of the SEE Programme
Target groups	Researchers, RTD entities

9. FINANCIAL PLAN

The aforementioned measures can seek funding from various sources. A presentation of the nature of the funding instruments and their status is follows below:

- **Regional Operational Programmes**: At the time of the writing of this report, the majority of regional authorities were developing thematic and policy priorities and strategic plans and were about to submit them to the national and European authorities for review and acceptance. Upon this, the various measures will be drafted and specified. It is considered that some of the measures proposed herewith can be included in the ROPs or are relevant/ compatible with the ROPs.

- **National Sectoral Programmes**: Again these programmes are under development in the majority of countries; the thematic priorities relevant to a) Research and Technological Development, b) Entrepreneurship and Competitiveness and c) Agriculture and Rural Development can also accommodate some of the measures proposed in this report.

- **Future Transnational Cooperation Programmes**: the South East Europe Programme splits into two transnational programmes: Danube and South East Gateway (renamed later on Adriatic-Ionian). These two new programmes will support the development and implementation of two Macro Regional Strategies: Danube and Adriatic-Ionian Regions. Thematic priorities of the Danube programme will be defined in line with the relevant draft EC legislation, the national priorities of Partner States, and reflect the needs of the programme area. Topics to be addressed by programme priorities may include many of traditional transnational cooperation topics, like innovation, transport, environment, etc. It is also expected that it can accommodate some of the measures proposed in this report.

- **Horizon 2020:** Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020) – in addition to the private investment that this money will attract. It promises more breakthroughs, discoveries and world-firsts by taking great ideas from the lab to the market. Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. Transnational research cooperation, industrial partnerships, human resources development, etc. are supported thus it can accommodate some of the measures proposed in this report.

- **Leveraging private funds:** Private funds shall be exploited as well for financing the listed measures. The realisation of the actions will result in a stronger cooperation of private and public stakeholders, both at regional and trans-regional level. These public private partnerships will implicate the direct involvement of industrial players and thus, increase also the possibility of co-financing from industrial side. Next to this fund raising possibility, financing mechanisms such as innovation and investment funds as well as venture capital funds for supporting entrepreneurship will be taken into consideration. The establishment of a business angel network is a further opportunity for providing capital for business start-ups.