

Innovation Strategy of the Republic of Macedonia for 2012-2020

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I. Introduction

Innovation, according to the definition provided by the Oslo Manual (OECD/Eurostat, 2005), consists in the implementation of a new or significantly improved product, a new process, a new marketing method or a new organisational method in business practices, workplace organisation or external relations. Innovation therefore goes beyond research and development and covers a broad range of activities that help firms become more productive and competitive. Innovation is a key driver of economic growth and as a result, the development of an innovation policy is considered as one of the cornerstones of the economic strategy of governments (OECD, 2010a). In the European Union, this has translated in the development of the EU 2020 and the related Innovation Union strategies (Barroso, 2011).

As the Republic of Macedonia strives to continue growing economically, it is important for the country to develop the competitiveness of its private sector. Because Macedonia will not be able to compete with low cost wages over the long term, improving competitiveness through knowledge and innovation is crucial. This strategy therefore aims to initiate the transformation of the country into a knowledge-based economy able to compete on international markets through its skilled labour and innovative companies. Given the limited availability of resources and the need to develop a critical mass of resources and competencies to compete internationally, a strategy of 'smart specialisation' provides a sound basis for building up the national system of innovation. Smart specialisation entails encouraging investment in programmes that will complement the country's productive assets to foster future domestic capability and interregional comparative advantage (Foray et al., 2009).

However, the strategy recognises that successful economic development does not necessarily coincide with an increasing share of production in high technology sectors. High value added activities can also be found in traditional sectors and innovation can help firms move from low-value added activities to high value added activities. Hence, instead of trying to artificially develop high technology sectors, the innovation policy of the country will take a neutral stance regarding sectors. It is up to complementary policies (related to areas such as education, science, industry, clusters and regional development) to direct resources towards sectors where endowments and capabilities offer the greatest potential for moving up the value chain, thereby facilitating smart specialisation.

The government of the Republic of Macedonia has already embarked the country on a path of reforms to facilitate growth and innovation. The Innovation Strategy complements existing government documents such as the Strategy for Industrial Policy 2009-2020, the SME Strategy for 2002-2013, the Research and Development Programme of the Government and the current Government Programme. For instance, many policy areas and objectives covered by the Ministry of Economy's Strategy on Industrial Policy 2009-2020 such as "Applicable R&D and Innovation" are also part of the Innovation Strategy. Furthermore, the Innovation Strategy pays particular attention to increasing the innovative capabilities of SMEs and is hence in line with the national SME policy based on the European "Small Business Act". Finally, the Innovation Strategy complements the new Government programme on R&D. While the latter has a focus on research institutions, the Innovation Strategy covers research institutions in the context of developing human resources for innovation and establishing linkages and knowledge flows with the businesses sector.

This Strategy takes into account the country's current state of development to ensure that policies to promote innovation are both focused and relevant for the country given that what works well in the context of an elaborate research and innovation system may not be so effective in the Republic of Macedonia.

The Strategy was designed within the framework of the Regional Competitiveness Initiative, a project conducted by the OECD Investment Compact for South East Europe with the financial support of the European Union. As part of this project, the government has requested the support of the OECD in developing an innovation strategy. Following a review of the national innovation system and a conference that enabled stakeholders to discuss what the priorities and policies of the innovation strategy should be, this document was drafted by a combination of government officials and OECD experts.

II. Governance

The Governance chapter describes the relationship between the national innovation policy and other policy frameworks as well as the relationship between the innovation policy and international, national and regional policy layers. The chapter also deals with governance arrangements related to the implementation of the innovation policy.

A. Relationship with other Government Documents

A.1. National R&D Programme 2012-2016

The National R&D Programme 2012 – 2016 aims at facilitating the transformation of Macedonia into a knowledge-based society. The National Programme defines the objectives, content and scope of scientific research. In particular, it covers the coordination, implementation and financing of scientific and research activities, human resources, research infrastructures, indicators of scientific and research activities achievements, international cooperation and synergies with the business sector. Gross expenditures on R&D are expected to grow significantly, reaching 1% of GDP in 5 years and 1.8% of GDP by 2020. The business sector is expected to account for 50% of gross R&D expenditures.

The National R&D Programme 2012-2016 focuses on several thematic areas:

- The development of an open society and competitive economy via support to socio-economic development, economic policies, structural reforms, education, research, information society, and the overall development of the national innovation system
- The development of low carbon society (energy efficiency, renewable energy sources, sustainable transport, implementation of clean technologies)
- Sustainable development (including sustainable management of natural resources, quality of air, water and land)
- Security and crisis management
- Socio-economic and cultural development.

Publicly funded research projects are expected to follow these priorities.

A.2. Program for Promotion and Support of the Technological Development (2012-2015)

The Program for Technological Development is a national document for promotion and support of the technological development of the country. It is aimed at implementation of the Strategy EU 2020 which promotes a smart, sustainable and inclusive development and is focused on strengthening the industrial sector and creating pre-conditions for growth and development, based on knowledge and innovation.

The Program for Technological Development (2012-2015) is adopted by the Government of the Republic of Macedonia for a four-year period in accordance with the Law on Promotion and Support of the Technological Development ("Official Gazette of the Republic of Macedonia", No. 47/11). The following relevant institutions participated in the creation of the Program and the Action Plan (2012-2015): the Ministry of Economy, Office of the Deputy Prime Minister for Economic Affairs, Ministry of Finance, Office for Industrial Property and the like.

The basic objective of the document is to provide stimulation of the factors for successful positioning of the Republic of Macedonia in the international market of knowledge and innovation. The determination of the need for intensification of the activities aimed at faster technological development based on transfer of knowledge, development research and innovation, should contribute to economic growth and development, as well as improvement of the business climate for development of the competitive capability of the enterprises, especially of those that are committed to development through their own potentials supported by the science.

The Program for Technological Development is promoting:

- research,
- knowledge creation and
- diffusion of technologies as objectives of the developmental (industrial) policy of the European Union.

A.3. The Industrial Policy of the Republic of Macedonia 2009-2020

The Industrial Policy of the Republic of Macedonia 2009-2020 is a national strategic document aiming to enhance the competitiveness of the Macedonian industry and the Macedonian economy more generally. The strategy focuses on knowledge, innovation and research as means towards industrial development. It aims at creating a stimulating business and investment climate for businesses wishing to develop new technologies,

improve their competitiveness and access markets. The document focuses on the following five areas of intervention: i) international cooperation and FDI stimulation, ii) applied research, development and innovations, iii) eco-friendly products and services for sustainable development, iv) the development of SMEs and entrepreneurship, and v) collaboration via clusters and networks.

The approach and objectives of the Industrial Policy of the Republic of Macedonia 2009-2020 are highly consistent with this Innovation Strategy. The implementation of both documents should thus be interlinked.

A.4. Action Plan for Competitiveness

In accordance with the Global Competitiveness Report for 2012 prepared by the World Economic Forum, a complete Analysis of the Competitiveness of the Republic of Macedonia was made, based on 12 pillars grouped in 3 areas:

Basic conditions:

- (i) Institutions
- (ii) Infrastructure
- (iii) Macro economy

Efficiency stimulators :

- (iv) Health and primary education
- (v) Higher education and science
- (vi) Efficiency of the market of goods
- (vii) Efficiency of the labor market
- (viii) Efficiency of the financial market
- (ix) Technological preparedness
- (x) Market size

Business sophistication and innovations:

- (xi) Business sophistication
- (xii) Innovations

Based on the results obtained from the analysis, priority pillars were determined and Action Plan for improvement of the competitiveness of the Republic of Macedonia was prepared, which was adopted by the Government in 2012.

A.5. EU and regional programmes

The Innovation Strategy will be implemented in the context of an increased collaboration between the Republic of Macedonia and the European Union. This entails the need to align the country's strategic objectives and policy measures with key strategic documents of the European Union. This will contribute to leveraging the external resources and competencies available and to a stronger inclusion into the European Research Area.

Innovation is at the core of the Europe 2020 Strategy (EC, 2010a) agreed upon by EU Member States at the June 2010 European Council. Europe 2020 puts forward the three mutually reinforcing priorities

- i) smart growth (developing an economy based on knowledge and innovation),
- ii) sustainable growth (promoting a more resource efficient, greener and more competitive economy) and
- iii) inclusive growth (fostering a high-employment economy delivering social and territorial cohesion).

Within the context of the Europe 2020 Strategy, the EU Member States have agreed on an action plan to achieve an Innovation Union (EC, 2010b). This action plan includes over 30 initiatives to

- (i) strengthen the knowledge base,
- (ii) get good ideas to market,
- (iii) maximise social and territorial cohesion,
- (iv) pool forces throughout the EU,
- (v) leverage policies externally and
- (vi) implement reforms of innovation systems.

To increase smart growth, the European Commission recommended national and regional governments to develop smart specialisation strategies to maximise the impact of Regional Policy in combination with other European Union policies (EC, 2010c). Assessments of specific research and innovation strengths and weaknesses and the development of appropriate strategies are crucial for smart specialisation.

Regional initiatives, including the OECD Investment Compact for South East Europe have complemented EU policy frameworks. At the South East Europe Ministerial Conference in November 2011, Ministers and high-level representatives endorsed a 2020 Vision for South East Europe calling for the consistent implementation of economic reforms to foster integrated, smart, sustainable and inclusive growth underpinned by good governance and the rule of law (OECD, 2011a). Particular emphasis is put on smart growth as the countries in the region committed to innovate and compete on value-added rather than low labour costs.

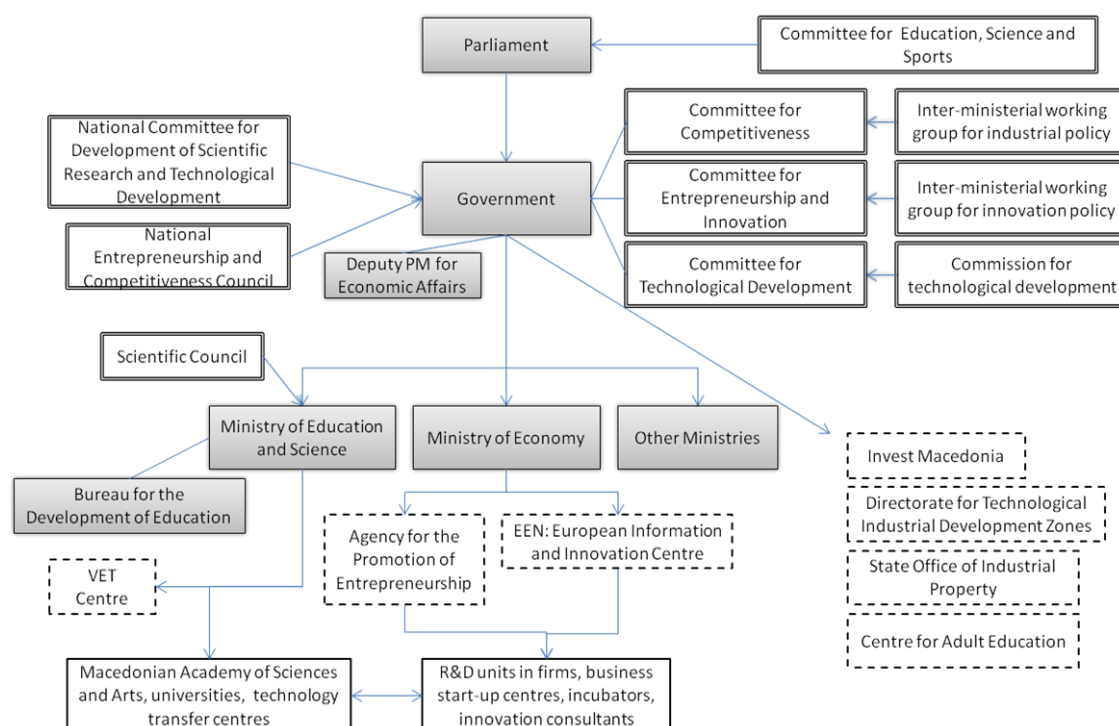
B. Governance arrangements

Governance should contribute to a strategic, realistic and coordinated approach to innovation policy. The Strategy addresses the chosen objectives simultaneously to improve the innovation system. Despite the complexity of innovation policy, a clear allocation of responsibilities for specific policy levels, measures and activities should be sought. Moreover, an important role needs to be given to stakeholder consultation and in-built policy learning processes based on monitoring and evaluation.

B.1. Policy coordination

Since responsibilities for innovation policy are shared between different institutions, institutional mechanisms will ensure a coherent approach and effective policy coordination. Figure 1 provides an overview of the governance structure of the national innovation system.

Figure 1: Governance structure of the national innovation system



Note: Grey boxes represent government and parliament, boxes with two lines represent advisory bodies, boxes with dashed lines represent executing agencies.

At the strategic level of the Government of the Republic of Macedonia, the Committee for Entrepreneurship and Innovation performs a steering role and ensures the position of innovation policy within government policies, programmes and projects, which also needs to be reflected in budgetary decisions. Coherent policy formulation will be sought with other national policy areas such as sciences, research and education, industrial policy and environment policy and also take into account regional and EU policies.

The Ministry of Economy and the Ministry of Education and Science are crucial institutions involved in the definition, implementation and monitoring of different policy measures from their respective domains. The implementation of specific policy measures also involves various government agencies, such as the Agency for the Promotion of Entrepreneurship, the Vocational and Education Training (VET) Centre, the Adult Education Centre etc. The government is planning to set up an Agency for Technology and Innovation by 2013.

B.2. Agency for Technology and Innovation

Having a centralised institution or a one-stop shop for innovation support could reduce the burden on firms and provide firms with better information. Such an agency could also ensure a more efficient capacity building (e.g. through technical assistance and twinning projects with relevant innovation agencies in the region or from the EU) and play a pivotal role in the development of the national innovation policy and the national innovation system. If it were to be established, this Agency for Technology and Innovation would have to be independent and transparent.

However, the decision to set up such an agency should be made cautiously, having in mind the required resources for the operation of the Agency itself and for the implementation of policy measures by the Agency. In other countries, innovation agencies usually focus on policy measures that require complex administrative procedures for selection and periodical monitoring of specific projects financed by grants or loans.

B.3. Dialogue between the public and private sectors and academia

Innovation policy is rather complex – it covers a wide array of policies and is governed by a number of different institutions. Its effective and efficient implementation needs to be based on triple helix principles. In other words, the implementation needs to include a dialogue between the public administration, the private sector and academia. To ensure the consistency and effectiveness of innovation policies, extensive inter-institutional dialogue and public-private consultations are needed. Stakeholder involvement should be incorporated into policy formulation, implementation and evaluation, in order to develop innovation policy that will contribute to the needs and interests of all key actors and of the national innovation system as a whole.

B.4. Evaluation and monitoring of policies

The monitoring and evaluations of innovation policy and its instruments will enable the government to draw the right lessons from existing initiatives and to allocate government funds more efficiently and effectively. In order to assist the implementation and monitoring of innovation policies, it is necessary to compile adequate and internationally comparable data through initiatives such as the Community Innovation Survey, the SME Policy Index or the Global Entrepreneurship Monitor.

The monitoring of the implementation of the Strategy will be done by an inter-ministerial working group coordinated by the Ministry of Economy, which will also be

responsible for collecting the relevant data from respective institutions on an annual basis. The working group will meet on a bi-annual basis and subsequently inform the Committee for Innovation and Entrepreneurship. An annual report with recommendations for improvements will be prepared and submitted to the Government.

Following the completion of the period covered by the Action Plan (2013 - 2015), there will be a periodic external evaluation of the innovation policy as a whole and its specific measures. The evaluation will be carried out by an independent group of experts, with the assistance of the Ministry of Economy and the Ministry of Education and Science.

III. Analysis of and challenges for the national innovation system

To support the development of the Innovation Strategy, a comprehensive review of the national innovation system has been conducted (OECD, 2012). This chapter summarises the main findings of this analysis.

Although several aspects of innovation policies are addressed by public institutions and strategies, no comprehensive policy framework for the national innovation system has been developed as of yet and many challenges remain to be addressed in the Macedonian innovation system. For instance, while some incremental innovation takes place in firms, businesses allocate few resources to research and development. More specifically, the Republic of Macedonia files fewer patents and trademarks and has a lower share of high tech exports compared to its peers in South East Europe.

Framework conditions

To support innovation, the creation of new technologies and the flow of information in both the public and the private sector, adequate framework conditions such as human capital, access to finance, intellectual property rights legislation and a favourable business climate are required.

Two positive developments for the educational system in the country were the expansion of the duration of primary education and the setting up of a Council for Vocational Education and Training as well as a Centre for Vocational Training to align school curricula with vocational training. This latter initiative is particularly relevant for the Republic of Macedonia given that there are important skill gaps in the country.

Much also remains to be done to improve lifelong learning and address the skills gap. Today adults have access to adult education only in the context of a career re-orientation following a period of unemployment. Very few employees get access to training to maintain and develop their skills in their work place, as companies invest little in training their employees.

A major weakness in the framework conditions for innovation is access to finance. More generally, companies consider access to finance as a major barrier for their development. High levels of collaterals are required for loans and guarantee schemes as well as public credit information services are underdeveloped. These weaknesses in the

financial sector hinder companies' capacities to invest and potentially innovate. Since innovative activities are often of higher risk and long-term nature, equity finance can represent an important alternative to traditional bank loans. The nascent efforts to create business angel networks, few of which are recorded in other countries in South East Europe, are therefore a positive aspect. Nevertheless, much remains to be done to improve access to finance in the Republic of Macedonia.

To further improve the framework for innovation and competitiveness in the country, the government has worked on creating a regulatory climate favourable to businesses. According to the OECD Investment Reform Index, restrictions to foreign direct investment appear minimal in the country (OECD, 2010b). The reforms that took place, such as improving the ease to start a business, helped placing the Republic of Macedonia as the country in the region with the best Doing Business Indicator 2011. Even though Macedonia has a regulation of intellectual property (IP) rights that is well advanced and it has ratified most of the respective international frameworks, enforcement of IP legislation can be improved.

Research institutions

Innovation and R&D in both public research institutions and the private sector are constrained by a significant lack of funding. The gross expenditure dedicated to research and development (GERD) represented only 0.18% of GDP in 2007, which is low compared to the average share of 0.46% in SEE economies (UNESCO, 2011).

To improve the Macedonian research facilities, the Ministry of Education and Science has planned to establish 189 sophisticated laboratories, expected to be built by 2014. 79 of these labs have already been equipped. These investments will provide an important opportunity for the research community but making the most of these facilities will require the mobilisation of human and financial resources as well as stronger science-industry collaboration.

The research output of research institutions currently suffers from the lack of collaboration with businesses and the lack of labour mobility. Furthermore, policies for intellectual property rights such as patents and trademarks, determining, for example, whether the rights should belong to the university or individual academics, are lacking. These policy gaps prevent the research institutions from fully contributing to innovation in the country.

Innovation in the business sector

The innovative activity of firms is positively correlated with many performance indicators. Firms that innovate are more likely to export and most firms experience significant increases in turnover and profits after introducing innovations.

While firms do innovate in the country, they dedicate few resources to R&D. Business expenditure on R&D accounted for only 23% of GERD in 2007 (Erawatch, 2010) compared to 55% in the EU (Eurostat 2011a). Furthermore, results from an OECD survey of 500 Macedonian firms conducted in 2011 show that half of the companies do not offer any form of training to their employees. Companies rely more on internal knowledge for innovation than external knowledge so that co-operation between companies and other stakeholders is limited. Links between companies and universities or research institutions are particularly rare, even though firms which have established formal links with academia tend to be more innovative.

Companies surveyed consider the high cost of innovation and limited access to funding such as bank credits or equity finance as the main constraints to innovation. Other constraints mentioned included a low market demand for innovative goods, the market power of incumbent companies, the low level of co-operation with academia or other stakeholders and the difficulties in identifying co-operation partners and the lack of management skills.

In line with access to finance being considered the main constraint to innovation, most companies favour financial contributions by the government to support innovation. A smaller share of companies indicated that support schemes to develop employee training or foster the ex-change of know-how between companies would be most useful to further develop their innovation potential. As almost half of the companies surveyed are not aware of existing support initiatives, raising companies' awareness with respect to the importance of innovation and related support measures should be a priority.

Linkages between innovation actors

A cost-efficient way to increase the innovation capacity of a country is to strengthen the linkages between businesses and between businesses and research institutions to facilitate knowledge flows. Even though several attempts are being made to increase those linkages in the Republic of Macedonia, there is room for improvement.

There are currently 15 clusters in the country according to the Ministry of Economy. The Ministry of Economy has also allocated some funds for cluster promotion and

development in 2011 and is further planning a new project to assist clusters and facilitate innovation. Nevertheless, existing clusters fail to successfully develop innovation and the commercialisation of new products. The main reason for this failure is the lack of complementarity within existing clusters. For example, in the textile cluster most companies are at the same position in the value chain. In consequence, the members develop loan jobs and compete against each other rather than complementing each other. Other existing measures to foster linkages are consulting services and networks of consulting services, provided for instance by the Macedonian Agency for Entrepreneurship Promotion (APPRM). At present, there are no Science and Technology Parks but a feasibility study exists to create one, though the project has not received funding yet.

An analysis of the national innovation system of the Republic of Macedonia reveals the following four challenges:

Limited capacities of research institutions: The R&D capacity of research institutions in the Republic of Macedonia is weak. Limited financial resources are dedicated to R&D and the number of researchers is low. To address this issue, the government has planned to establish 189 laboratories for universities and MASA (project Laboratories 2010/2020) by 2014. However, building the research capacity will also entail ensuring the sustainable functioning of these laboratories. Finally, research institutions and universities are not sufficiently attuned to the needs of the private sector – the current investments into sophisticated laboratories should also be used for bringing the two sectors closer together.

Insufficient propensity to innovate in the business sector: To be competitive on the domestic and export market, firms need to effectively engage in innovation activities. Enterprises innovate by developing new products and processes or by improving their marketing and organisation strategies. Some companies realise the need for innovation, but experience hurdles when trying to engage in R&D activities, which often require significant human and financial resources. Another major obstacle to innovation in the private sector is the lack of incentives to back innovation-related activities in businesses and the limited public awareness of existing public measures to foster innovation. Efforts need to be made to raise the awareness of companies that currently do not innovate on the need and benefits of introducing the four types of innovation: product, process, marketing and organisational.

Inadequate framework for knowledge transfer: There is a lack of channels for knowledge flows in the economy. Increasing the absorption capacities of firms and the

linkages in the economy would help the economy derive the benefits from existing knowledge and research. In particular, the most innovative companies are not well linked with the rest of the private sector and initiatives such as inter-firms networks or clusters are underdeveloped or have not been particularly successful and sustainable so far. Collaboration between businesses and research institutions, which could increase the commercialisation of research, is also very limited and could be improved. However, because the commercialisation of research cannot reach its full potential before building up the research capacity of research institutions, collaboration between businesses and public research institutions may instead focus on training for skills development and on technology adaptation at this stage.

Lack of co-ordination of policy-making: Because policies supporting innovation touch upon a number of policy areas, including research, education and SME support, the responsibility for innovation policies is split between several institutions, including the Ministry of Education and Science and the Ministry of Economy. Therefore, a continuous inter-institutional dialogue needs to be established. Furthermore, as policies in these areas ultimately aim to develop a competitive private sector, public-private consultation needs to be developed or strengthened.

The strategy will primarily use traditional instruments for innovation: those which were put in practice in many countries, allowing for the build-up of knowledge on conditions in which these tools work or do not work. Some instruments, such as innovation vouchers or measures to connect the Diaspora with the domestic economy to foster synergies, appear particularly relevant for the Macedonian context.

With time, new industries may develop and traditional industries may disappear at the same time. The innovation policy for businesses will therefore primarily aim at fostering the innovation capabilities of businesses horizontally and will not artificially impose sector specialisation. While sector specific measures may be applied, innovation policy will not target high technology sectors in particular.

IV. Vision and Strategic Objectives for Innovation Policy 2012-2020

The innovation strategy of the Republic of Macedonia for 2012- 2012 is based on the following **vision**:

The innovation strategy will drive competitiveness and economic development based on knowledge and innovation, thereby creating high value employment and prosperity for Macedonian citizens.

By 2020, the Republic of Macedonia should have an effective national innovation system, co-created by all stakeholders and open to the world. The government will place research and innovation at the heart of its policies and ensure adequate financial support.

In order to fulfil this vision, four strategic objectives have been defined:

- Enhance the business sector's propensity to innovate
- Strengthen human resources for innovation
- Create a regulatory environment in support of innovation
- Increase knowledge flows and interactions between innovation actors

A. Enhance the business sector's propensity to innovate

Innovation in the business sector can take many forms such as the development of new products as well as processes, organisational innovation and marketing innovation. Policies will reflect this broad concept of innovation by avoiding too much emphasis on research and technology driven innovation. Policies will in particular aim at upgrading the innovation capacities of existing firms and fostering the creation of innovative business start-ups. The demand for innovation will be supported through better information and measures that encourage private investment in R&D and innovation. Furthermore, the Government will take measures to facilitate the access to loans and equity finance of innovative companies.

A.1. Raise awareness of SMEs on the benefits of innovation

a) Rationale and state of affairs

Spending on innovation activities should not be viewed as an expense but as an investment. A business survey conducted for the OECD Assessment of the National Innovation System (OECD, 2012) found evidence that Macedonian firms that innovated in the period 2008-2010 had seen their profits or turnover increase. While firms associate innovation with increased risk, they should realise that by not innovating they are also exposed to the risk of losing their competitiveness (EC, 2010b). At present, there is a significant lack of business awareness, in particular among SMEs, on both the benefits of innovation and the existing government support measures for innovation. Almost half of surveyed companies are not aware of the various government support measures for innovation and only very few have actually benefitted from these measures (OECD, 2012).

To increase the propensity of the private sector to innovate, the awareness amongst firms on the benefits of innovation and available support policies will be raised. It will be emphasised that innovation goes beyond R&D and encompasses product, process, organisational and marketing innovations. Raising awareness requires a systematic and coordinated effort by major stakeholders within the national system of innovation – including government, business associations and universities. This will be done through two measures: information and brokerage events and competitions and awards. Maximum visibility will be secured and all events will incorporate follow-up activities.

b) Measures

(i) Information and brokerage events

Information events such as seminars and conferences will be organised regularly to educate SMEs on the benefits of innovation, available incentives and good practices in innovation management such as the IMP3ove programme supported by the Europe INNOVA initiative. They will be held throughout the country and in collaboration with business associations, chambers of commerce and business centres.

Brokerage events will be organised in order to stimulate networking between companies, science-industry collaboration and the internationalisation of Macedonian companies.

(ii) Organization of a competition for starting a business

The competitions and awards provide a possibility for a public recognition and visibility of the innovative ideas, as well as for their development in new start-up businesses or projects. Likewise, they position innovations as a social value.

The existing competition for business plans for start-up businesses (organized by the Business Start-up Centre) and awards (for entrepreneurs and patent of the year) will be further developed and integrated with the other measures for innovation policies. The training and following of the participants in the competitions is the basic aspect of such competitions. The winners will receive further support in order to have an access to an external expertise or national/regional financial instruments.

(iii) Organization of a competition for stimulation of partnerships based on the of triple helix among the science, businesses and Government

Partnership on the principle of triple helix will be stimulated as an innovative and cost-effective measure that is connecting businesses, research institutions and local government in a specific sector of the economy – in a form of a competition at which the best projects receive technical assistance for further development. A successful example that may serve as a basis for development of this concept is the competition on a triple helix basis in Bosnia and Herzegovina.

A.2. Establishment of a Fund for Innovation and Technological Development (FIT)

a) Rationale and state of affairs

The Fund for Innovation and Technological Development is formed with an aim of providing additional sources for financing of the small and medium enterprises, with a special emphasis on innovation. Through this fund, grants for innovation, technical assistance for the companies for facilitation of the access to the regional fund, conditioned loans (royalty), equity investments, financial assistance for research and development and the like will be provided.

a) Measures

(i) Technical assistance (consulting services) for small and medium enterprises

It has been shown that the voucher schemes are an effective instrument of the policies for supporting the access of the individual small and medium enterprises to the external services which helps them to increase their capabilities for innovation.

In order to have an influence on the individual companies, the vouchers should have a determined value. In order for an effect on the entire economy to be achieved, a significant number of vouchers will be distributed to the firms.

Consequently, the existing voucher scheme for the small and medium enterprises will be expanded in order to cover a larger number of small and medium enterprises and to facilitate their access to the external services such as research and development through external services, testing, design, market research, business consulting for writing business plans or feasibility studies.

The expansion of the vouchers into co - financing of the activities for innovation will be regulated by a special law.

The advantage of the vouchers for the small and medium enterprises is their flexibility and that they are not a great burden for the public administration.

Likewise, the voucher schemes often help in building a longer term labor relation between the companies and consulting business or public research organizations, in a manner in which they stimulate the activities for innovation even more than the initial project financed with the voucher.

With the increase in the demand for services for support in the long-run, the vouchers for innovation have also helped in strengthening the infrastructure for innovation on the supply side.

(ii) Support for establishment of University spin off companies

The basic idea behind the project is to provide financial support for establishment of University spin off companies – new companies founded in order to commercialize the knowledge derived as a result of the scientific-research and development research projects. By establishing University spin off companies that would generate in the future additional revenues both for the company and the universities the capacities of which would be used for research. The direct effect of supporting the companies to develop their own and new technologies and commercialization of the innovation, is an increase in the competitiveness of the economy, decrease in unemployment and acceleration of the technological development.

(iii) *Grants and commercialization of R&D projects*

The public research institutions will be encouraged to carry out research for the needs of the business sector. This can take several forms – including joint research projects (carried out in cooperation with domestic companies, multinational enterprises or clusters) and contractual research.

Currently, through the Program for realization of the scientific research activity, technological-technical development in the Republic of Macedonia, the support is provided to 25 projects for Research and Development that include cooperation between the small and medium enterprises and academic institutions.

(iv) *Grants and conditional loans for innovation-related expenditure*

Besides SME vouchers, private investment in innovation will be encouraged by providing direct subsidies to firms to finance pre-competitive R&D (i.e. R&D which private capital will not finance because of a too high perceived risk) undertaken by individual SMEs, or by SMEs collaborating with academic institutions. Grants are much larger in value and targeted towards a few selected initiatives. While they require significant financial resources, in the medium to long term they correspond to a national investment into innovation, which may result in a positive rate of return. Alternatively, innovation projects can also be financed by conditional loans at favourable rates, which are repaid only if the product developed within the project is successfully commercialised – in other cases it becomes a grant.

Public authorities will carefully select the recipients of public funds and monitor closely the project. For this, the establishment of a competent innovation agency, capable of recognising projects that are both feasible and marketable, is needed. Although being distortive when targeted towards certain sectors or activities, dedicating resources to specific projects through subsidies can allow achieving critical masses given limited resources.

Successful experiences from various countries show that subsidies can help firms innovate and grow, resulting in higher tax revenues for the government that can exceed the initial grant.

(v) *Support of eco-innovations*

By providing financial support to the enterprises that wish to introduce clean technologies or production of ecological products, not only would the environment be protected, but also the awareness of the enterprises for the economic benefits from introduction of the ecologically clean production would be raised, thus increasing the competitiveness of the market when selling eco products.

A.3. Encourage private investment in R&D and innovation

a) Rationale and state of affairs

While the Republic of Macedonia dedicates few of its resources to R&D and innovation overall, its business expenditure on R&D (BERD) is particularly low. BERD represented 23% of gross expenditure for R&D (GERD) in Macedonia in 2007 compared to 54.7% for the EU in 2008. However, besides increasing private investment in research activities, firms should invest to develop products, processes, marketing and organisational processes. The majority of Macedonian firms consider high costs and access to external financing as the main obstacles for innovative activities (OECD, 2012).

In order to get a bank credit, firms need to present collaterals of a value of 180% of the loan according to the OECD Investment Reform Index 2010 (OECD, 2010b). At the same time, equity financing is virtually non-existent. The emergence of a venture capital sector requires investors, experienced venture fund managers and a market for initial public offerings (Hall and Learner, 2010). These conditions are not yet met by Macedonia.

To ease these financial constraints of firms and SMEs in particular, both direct financial support and assistance to access external financing will be provided. Policies that will be introduced include SME vouchers, grants/conditional loans and support to imports of R&D equipment. Furthermore, SMEs will be assisted to access credit guarantee schemes, subsidised loans and regional funding initiatives. A business angel network will also be supported.

b) Measures

(i) Deduction of or exemption from the tax or customs duties for Research and Development

Tax deductions or exemptions on imports of equipment help setting up new or strengthening the existing R&D centres within companies. Such a measure is likely to be targeted at larger R&D performers, which are able to finance their own R&D centres, but it can also assist SMEs in building up their intramural R&D activities.

The current regulation exempts imports of R&D equipment from customs duties. The required permit is jointly given by the Ministry of Finance and the Ministry of Education and Science.

Tax credits on R&D expenditure can also become a powerful tool for attracting and keeping foreign direct investment in R&D-intensive activities. Tax credits are less distortive and need no public oversight for project selection. The main concerns here include possible “free riding” (i.e. when firms get incentives for R&D which they would do in any case) and misallocation of costs to appear as R&D costs. Development of an audit procedure is necessary to prevent fraud. Alternatively, companies may also be asked to announce their R&D projects in advance and apply for their approval to the Ministry of Education and Science, which would make the subsequent audit easier. Since in Macedonia the tax on corporate profits is low, an appropriate measure may be to reduce taxes on employment for R&D personnel. This is a measure which was used in the Netherlands via the Research and Development Promotion Act. An evaluation of the policy was conducted in 2007 and found that the impact on R&D expenditure depended on the firm’s size - the effect was greater for small companies (OECD, 2011b).

(ii) Credit guarantees and subsidised loans

Debt finance is key to financing incremental innovation and the main source of external financing for most SMEs. Facilitating SMEs access to bank credits will therefore remain a priority. For instance, providing credit guarantee schemes can help innovative companies’ access credit from commercial banks and the Macedonian Bank for Development Promotion can offer credit lines targeted at innovation commercialisation.

(iii) Supporting access to regional financial instruments

Since profoundly innovative activities are characterised by high risk and long term time horizon, traditional bank loans are not suitable, and equity finance such as venture capital (VC) and business angels can be an alternative. The Government has planned to set up Equity and Mezzanine Fund, but its resources may be limited for this purpose. However, a regional initiative is being developed to address the issue of access to finance: the Enterprise Development and Innovation Facility (EDIF), a €140million facility set up by the European Investment Fund, the EBRD and the European Commission and

set to start operations in late 2012. It will contain an Innovation fund, and Expansion fund, and a Credit Guarantee scheme. Investment readiness schemes (e.g. training to entrepreneurs to be able to write “bankable” business plans) and promotion activities aimed at the EDIF fund managers will be provided in order to ensure that Macedonian firms get sufficient attention and equal access to the fund.

(iv) Support to business angel network

Business angel investing occurs when a high net worth individual directly invests in an innovative start-up company. Such investments occur for amounts between 20,000 and 100,000 Euros, a range not covered by venture capital funds. Business angel networks help business angels interact, exchange information and share risk by co-investing in a portfolio of start-up ventures. The Government is to organise information dissemination about angel investing, and the facilitation of business angel networks. Legal protection may also be a problem for angel investors, which typically are minority shareholders. Specific tax incentives can also be considered to encourage angel investing – for example France has introduced a tax break on the wealth tax for angel investors.

B. Strengthen human resources for innovation

Institutions and policies can only help foster innovation. Ultimately, innovation arises from the creative actions of people. Hence, the development of a pool of talented and skilled human resources is fundamental to foster innovation and economic growth in Macedonia. Policies therefore will ensure that education at all levels prepares people for the labour market, notably by providing competencies that will help firms be innovative and competitive. In particular, policies will aim at adapting education policy to develop the skills needed for innovation, at improving the quality of vocational training and promoting lifelong learning and at making the education at universities more relevant for innovation.

B.1. Adapt education policy to develop the skills needed for innovation

a) Rationale and state of affairs

While the Council for Vocational Education and Training and the Centre for Vocational Training already seek to align the school curricula to the needs of businesses, efforts to make sure that the courses are fully adapted need to be continued. This requires setting up evidence-based policy mechanisms that will incorporate skills and training needs

analysis, stakeholder consultation through a skills council and curricula and quota adjustments.

b) Measures

(i) Skills and training needs analysis

The Employment Services Agency has already established a regular assessment of skills needs based on 2,960 SMEs and covering 15 sectors. This existing assessment will be continued and further improved, notably by including indicators related to cognitive, behavioural and technical skills for innovation and by identifying long term trends. This will enable better alignment of educational programmes with current and future long term needs of the labour market. This will not directly be translated into improved innovation performance, but it will facilitate skills and competences of the workforce upon which innovation is ultimately based. The Ministry of Economy will conduct training needs analysis and cooperate with SEECEL (South East European Centre for Entrepreneurial Learning) to develop a training needs analysis tool to support the up-skilling of entrepreneurs in the region as a means to increasing the competitiveness and sustainability of regional economies.

(ii) National Council for Higher Education, Science, Innovation and Technologies

The Council for Skills is a body that will undertake the competences of the Council for Scientific and Research Activity, National Committee for Scientific and Research Activity, Committee for Technological Development and Board of Ethics.

It will be formed with an aim of expanding the dialogue among the educational institutions, industrial sector and government institutions.

(iii) Curricula and quota adjustments

Currently, the Ministry of Education and Science has been assessing and adjusting 70 curricula. The results of the skills needs analysis and the dialogue between businesses and public education and training institutions will continue to be used to adapt the education curricula and quotas to the needs of the economy. This will not only lead to improved labour market performance, but it will also facilitate employability of the labour force and, eventually, innovation performance of the economy.

(iv) Ensure the quality of teachers and trainers

The quality of education depends to an important extent on the capabilities of teachers and trainers. In order to ensure high quality of teachers, accreditation and internal and external quality assurance systems will be implemented.

(v) Trainings for writing and submission of international patent applications

The Ministry of Economy will undertake measures for training the legal representatives how to write and submit good quality international patent applications. With this, it is expected for the number of international patent application by the citizens of the Republic of Macedonia to be increased.

B.2. Stimulative measures for talented students and stimulative measures for the professors engaged in the preparation of the most successful students

a) Rationale and state of affairs

Talented pupils, that is, students, who possess exceptional intellectual potential and knowledge in a certain area, are present in every environment, regardless of their economic, social and cultural background. With an adequate support and right direction, these students may become the future driving force not only of incremental, but also of radical innovations, both in scientific-research and in developmental-research and applicative areas.

That is precisely why it is necessary for a mechanism to be created for their operational and material support, stimulative measures to be applied for the development of their talents and directing their intellectual and analytical potential towards applicative activities.

b) Measures

(i) Competitions for the pupils and students from primary and secondary schools

In order to stimulate the pupils and students from the earliest age to improve and develop in the areas in which they possess interest, it is necessary to prepare a strategy/plan for organization of the annual competitions for primary and secondary schools at the level of municipalities and the Republic of Macedonia in mathematics, physics, chemistry, and other natural sciences and to provide awards for the best ones, awards for the teachers of the best ones (in order to avoid subjectivity in awarding the pupils and students, there should be an award for the teacher in case the pupil or student participates in international competitions and is among the first 75% of the competitors). The award for the teacher could be 20% increase in his/her monthly salary, for the pupil/student it would be enrolment in any public secondary school or faculty without taking an admission exam or being ranked otherwise.

(ii) Competition for innovations

The young minds have often a great intellectual capacity that can produce ideas with commercial potential. What is necessary for realization of the ideas is for a mechanism to be established that will stimulate the creativity of the young population, and at the same time it will animate the business community about the availability of ideas that could improve their products, services or processes. One of the manners for establishing a link between the young minds and the companies is the organization of competitions for innovations, not only at national, but also at international lever. A successful example is the Dream Line ([Düş Cizgisi](#)) competition in Turkey.

(iii) Virtual business game that simulates everyday business activities of the SMEs

The Ministry of Education and Science in cooperation with the Universities in the Republic of Macedonia will create a virtual game that simulates the everyday life of a company for a period longer than six months. The students countrywide will be organized in teams and will their capabilities to manage a business, to make decisions and work together will be tested, The main objective is to develop a culture of entrepreneurship among the students which are trying to find ways for starting a new business. The game will promote concepts of competitiveness, ethics and develop skills for management of the small and medium enterprises. Valuable awards will be provided for the winners.

B.3. Increase the quality of vocational training and promote lifelong learning

a) Rationale and state of affairs

While tertiary education provides people with in-depth academic and technical skills relevant in particular for researchers, vocational education and training (VET) provides people with more practical skills for a wide array of occupations. High quality and targeted VET can therefore help to reduce the skills gap, which is a major weakness in the national innovation system. Furthermore, the skills acquired through VET are particularly relevant for incremental innovation, such as tooling up, design, prototype development and testing. Finally, VET is an important element of successful lifelong learning as firms can use VET to increase the skills of their employees.

Vocational education and training is very wide-spread in Macedonia with approximately 60% of secondary education students in VET. A Council for Vocational Education and Training and a Centre for Vocational Education and Training, which aim respectively to increase the links between the VET system and social partners in the field of education policy and in the development of the curriculum, have been set up. Further efforts will be undertaken to strengthen these institutions and ensure that the programmes reflect the needs of the labour market and that students can develop work experience during their studies. The use of VET for lifelong learning will also be strengthened. In 2010, 3.2% of adults (25-64 years) participated in lifelong learning, which is only about one third of the EU27 average of 9.1%. Firms will be supported to provide workplace training to their employees.

b) Measures

(i) Increased capacities for the VET Centre and Adult Education Centre

Additional investments into the VET Centre would enable it to increase its capacities and fulfil its mission more effectively. The Adult Education Centre is currently receiving technical assistance in order to develop an adult training system for all citizens including specific programs for excluded persons, school leavers, and unqualified people, leading to vocational & social inclusion.

(ii) Increase in the attractiveness of the research activity

The new university laboratories have sophisticated devices and equipment for scientific, development and applicative research in the areas of the medical sciences, biotechnical sciences, social sciences, humanitarian sciences, technical-technological sciences, natural and mathematical sciences and information technology. In order to popularize them, it is necessary to map the capacities of the laboratories, to plan promotional activities in the country and abroad as well as stimulative measures for retaining the domestic researches and attracting foreign PhD candidates and researchers.

(iii) Introduction of incentives for participation in scientific meetings

In order for the Macedonian researchers and scientists to be acquainted with the most recent world inventions, it is necessary to invest in their participation in scientific meetings, seminars and conferences, as well as study visits abroad. In that regard, it is anticipated for a Regulation on the Procedure and Specific Criteria for Financing the Participation to be prepared

B.4. Make tertiary education more innovation-oriented

a) Rationale and state of affairs

While entrepreneurship classes have been introduced in primary and secondary education, there is a gap in the university system on innovation education. On the other hand, entrepreneurial learning at universities is crucial for making universities key drivers of sustainable and smart growth (SEECCEL, 2011). Incorporation of entrepreneurial learning into university education will increase the number of highly educated opportunity-driven young entrepreneurs, some of which will be capable of building enterprises with a high growth potential.

b) Measures

(i) Innovation and entrepreneurship classes

To increase entrepreneurial capacities of young people, entrepreneurship classes are being introduced in primary and secondary education. However, a particularly important component of entrepreneurial education is at the university level. This entails raising awareness and motivation among students, offering innovation classes and training students in the entrepreneurial knowledge, skills, and abilities to identify and exploit opportunities.

(ii) Internship programmes

Internship programmes of 3-6 months as part of higher education studies will be made available to a number of students. These programmes have proven their effectiveness, notably during an USAID-sponsored project, and need to be developed and expanded. They do not require significant resources but can significantly help people acquire entrepreneurship and innovation-related skills. The relevant law on internships has been drafted and will be adopted in 2012.

(iii) Joint diplomas, MA and PhD studies in the industry

The Joint studies cover study programs in which, in addition to the standard study semesters, additional semesters are passed in companies where concrete projects are elaborated. For graduate studies, the number of additional semesters may be 2 to 4, whereas for MA studies from 1 to 2. Such programs have already been successfully implemented in the University Waterloo in Canada, University Drexel in Philadelphia, as well as Steinbeis center for management and technology in Berlin.

(iv) Setting up advisory boards at universities

Public universities will be encouraged to set up advisory boards that will include private sector representatives. These advisory boards will work on science-industry collaborations and the accountability and responsiveness to the needs of the labour market.

C. Create a regulatory environment in support of innovation

Regulatory environments shape the mid- to long-term volume and direction of innovation activities to a considerable extent. The regulatory environment includes many aspects of the innovation system such as standards, public procurement activities and intellectual property rights. The quality and effective implementation of regulations is crucial for a sound business environment that supports the innovative activities of domestic firms and attracts foreign direct investment. Besides supporting innovation, the existence or absence of legislation can also constitute obstacles to developing and deploying new technologies and to the emergence of new markets. The government will create a regulatory environment favourable to innovation to ensure that profits stem from productive and innovative activities rather than rent-seeking behaviour such as monopolising the market or corruption. This will require making administrative procedures and planning both reliable and efficient, reducing the administrative burden

to the necessary minimum and making sure that regulations do not constitute barriers to innovation. Regulations will address the needs of innovation actors, providing them with the right incentives to innovate.

C.1. Provide an effective regulatory environment for academics and research institutions

a) Rationale and state of affairs

The MoES finances the following types of research projects:

- national research projects (whose beneficiaries are public and private universities and research institutes),
- research and development projects (collaboration between SMEs and academic institutions),
- bilateral projects (research collaboration between domestic and foreign researchers from a specific country) and
- EUREKA projects (whose beneficiaries are SMEs).

The number of projects and their total budget varies in accordance with the availability of financial resources. International peer review is not mandatory in project evaluation, but it is used in some cases.

In Macedonia, academic's rights and duties regarding intellectual property and consultancy services are not defined well. Hence, it is important to create a legislation whereby researchers have something to gain from collaborative projects and innovations to encourage research and the registration of property rights and whereby universities get a fair share of income and property rights to reflect their contribution to the research process. The government currently implements the project Patent.mk in order to stimulate patenting and collaboration between businesses and academia. Moreover, consultancy work of academic staff should be regulated by labour legislation and internal acts of academic institutions.

b) Measures

(i) Legislation for establishment of the Fund for Innovation and Technological Development

Taking into consideration the best practices from the region and the world and aimed at successful setting and functioning of the Fund for Innovation and Technological Development, legal framework will be established for defining its concept, competences and functioning.

(ii) Allocation of the funds for research on competitive basis – improvement of the criteria for allocation of the funds intended for scientific and research projects

Taking into consideration the limited availability of resources for research projects, it is important to pool the resources and distribute them on competitive basis, by application of criteria of excellence.

The Ministry of Education and Science, when distributing the funds, distinguishes between basic projects and 25 projects for research and development, that include cooperation between the small and medium enterprises and researchers and require from the small and medium enterprises to submit business plans and participate financially in the conducted research.

The evaluation of the project should be based on international peer review.

Efforts will be invested in increasing the dialogue between the State Office of Intellectual Property and the Ministry of Education and Science. The criteria for allocation of the funds shall especially take into consideration the history of patents and the potential for patents.

(iii) Incentive based salary and career path of academics

The salary and career path of professors and researchers will be based more on performance and research output. The researchers with exceptional performance, in terms of research articles and patents, will be rewarded. A programme for financing junior researchers will provide support to junior researchers undertaking PhD research. Furthermore, specific calls for projects for young researchers will be published in order to support the transformation of best junior researchers and post-doctoral students into independent researchers.

(iv) Coherent IPR regulation for public research institutions

At present, IPRs are owned by the researcher. The regulation will clarify the IP rights between academic personnel and research institutions facilitating the commercialisation of research results. This regulation will be an important element for the development of technology transfer offices.

(v) Regulation of entrepreneurial leave

The introduction of a regulation that would stimulate the creation of spin off companies, that is, companies established on the basis of the findings of a member or members of the research group at a University. Two alternatives can be introduced: an option in which the researcher may divide his/her own time between the academic obligations and the activities in the spin-off company, by which he/she can remain in contact with his/her academic environment or the option in which the researcher can take a two-year entrepreneurial leave, so that he/she can be totally dedicated to the new company, but in case of a failure, there will not be a risk of losing the previous job.

C.2. Adapt public procurement practices to encourage innovative solutions

a) Rationale and state of affairs

There is an extensive literature on demand side measures to encourage innovation and the development of new technologies (OECD, 2011c). However, such measures require important financial resources, their implementation is demanding and their overall effect does not necessarily justify the cost, especially in small open economies.

However, there is still scope for a demand-side approach aimed at incremental, rather than radical, innovation. Public procurement practices can be modified by introducing functional requirements rather than detailed specifications. Such an approach is suitable for complex projects that require the optimisation of multiple parameters at the time of development and have costly maintenance such as transport infrastructure, refurbishments of public buildings in an energy-efficient way and ICT systems. Introducing functional requirements and making the contractor responsible for the whole lifecycle of the project will incentivise innovation.

b) Measure

(i) Introduction of functional requirements in public procurement

The current legislation covering public procurement and public-private partnerships will be revised to promote functional requirements and specify the scope of their use. Furthermore, training will be provided to public procurement officers in institutions that will use functional requirements and bodies that control public procurement activities to prevent fraud.

C.3. Provide for a competitive business environment

a) Rationale and state of affairs

The best facilitator of innovation is often intense competition in particular markets, which stimulates firms to differentiate their goods and services from competitors. External pressures to innovate are often more important than the internal resources and competences of companies, which can be supplemented by cooperation with partners. A competitive business environment can be provided by keeping barriers to entry low, by discouraging anti-competitive behaviour of incumbent firms, as well as by providing an efficient public administration and rule of law.

The quality of the business environment is particularly important for SMEs and foreign entrants. The procedure for setting up new firms should be simple and the costs should be as small as possible. Efforts have already been undertaken in recent years as reflects the country's performance on the World Bank Doing Business Index; it ranks 5th on the ease to start a business. However, only simplifying the administrative procedures will not facilitate the creation of new firms in general and new technology based-firms in particular unless other prerequisites, such as access to human resources, technology transfers and access to capital, are fulfilled. Foreign companies investing domestically are particularly sensitive to administrative barriers. The attraction of foreign direct investment therefore also depends upon lowering the costs of entry.

Hence, the quality of the business environment will continue to be regularly monitored and improved.

b) Measures

(i) Monitoring and improving the business environment for SMEs

The regulatory business environment for SMEs is assessed and monitored in the context of the SME Policy Index project. The SME Policy Index is a benchmarking tool developed by the OECD and the EC for EU pre-accession economies to monitor and evaluate progress in implementing the Small Business Act for Europe. These activities will be continued and the results and recommendations of the assessment of the regulatory environment for SMEs will be used to adapt regulation and the institutional framework to improve the business environment for SMEs.

(ii) Implementation of competition policy

Incumbent firms often use a variety of means to discourage competition. The effective and proactive implementation of competition policy should discourage firms with market power from seeking rents through anti-competitive behaviour.

D. Increase knowledge flows and interactions between innovation actors

Innovation often stems from close interactions between users and suppliers of research such as collaborative projects and networks and triple helix partnerships. Hence, removing obstacles and promoting collaboration between the different innovation actors is an important and in many cases cost-efficient way to improve the innovation system. Attuning the research institutions to the needs of the business sector is a precondition for these effective interactions and knowledge flows to take place. To increase knowledge flows and interactions between innovation actors, policies will aim at fostering business networks and clusters, embedding foreign-owned and innovative firms into the national innovation system, supporting cooperation between research institutions and businesses and strengthening the linkages with the Diaspora.

D.1. Foster business networks and clusters

a) Rationale and state of affairs

As businesses interact, businessmen can benefit from each other's knowledge and experiences. Furthermore, interaction amongst businesses can facilitate collaboration which in turn enables the pooling of resources to undertake projects and benefit from economies of scale. At present, collaboration between firms in Macedonia is limited (OECD, 2012). Half of product innovations are developed internally by firms and only a small share of these innovations results from collaboration with other businesses or research institutions. Most innovative cooperation between businesses takes place with either customers or suppliers but only to a very low extent with other firms, including competitors. While more than two thirds of businesses would like to cooperate with customers or suppliers in the future, only one third would like to cooperate with competitors. However, there is much potential for cooperation between firms operating in the same sector, even for competitors. Firms can cooperate when purchasing equipment, testing materials, training staff, and marketing and distributing products abroad. Clusters are present in the country and have been supported by a variety of donors. Presently, there seems to be a lack of capacity to innovate in the existing clusters and some of them may not be sustainable. Yet, because no thorough evaluation of the clusters exists, it is difficult to assess their strengths and weaknesses precisely.

Cluster policy will therefore begin with a thorough evaluation of existing clusters. Support will then be concentrated on a few business driven and sustainable clusters that have a clear strategy. In addition to financial support, the government aims to set up a register of companies with the greatest research and innovation potential and organise trainings at the level of clusters.

b) Measures

(i) Evaluation and prioritisation of cluster support

An inventory of existing clusters and networks will be made followed by an evaluation of the existing initiatives in order to prioritise resources available for support. Support measures will focus on several carefully selected clusters with clear and feasible strategies for future development. Clusters do not need to be high-tech or R&D intensive, they can evolve around any sector with a comparative advantage.

(ii) Participation in trade fairs

Trade fairs and international business events can provide clusters, networks and individual firms with access to the relevant knowledge and thereby encourage investment in innovation and new collaborative projects. Subsidies aimed at participation in such trade fairs could provide high impact at a relatively low cost. These activities will be coordinated with other export promotion activities implemented by the Government.

D.2. Increase knowledge flows and interactions between research institutions and businesses

a) Rationale and state of affairs

The collaboration between businesses and research institutions is at present very limited and could be enhanced. However, because both research institutions and businesses carry out few research activities, there is a limited scope for collaboration. Besides the research output of some faculties, research output from public research institutions currently has a limited potential for commercialisation. In addition, firms and more particularly SME's have a weak absorptive capacity with respect to academic research and would not benefit so much from co-operation. Commercialisation of research requires prior improvements in both the research capacity of research institutions and in the absorptive capacity of businesses. Collaboration between businesses and public research institutions may instead focus on training, technology adaptation, testing and manufacturing extension services. This will enable research

institutions to become more aware of the needs of businesses while avoiding putting too much burden on their research capacities.

There are several IT applications that provide information on researchers, institutions, projects and their output. E-CRIS is a web application which includes databases on researchers, research organisations and projects. It can be developed into the backbone of the national information system in the area of scientific research and also be integrated into European initiatives. The Ministry of Education and Science has developed a database of the scientific researchers and research organisations.

To increase the research capacities of research institutions, the Republic of Macedonia has so far invested in constructing 79 sophisticated laboratories within the universities' settings. In total, 189 laboratories have been planned for 2014. This sets the necessary infrastructural basis for developing a knowledge-based economy, oriented towards innovation, research and development. Furthermore, these infrastructural capacities are in many areas surpassing the quality of research facilities in the surrounding countries. For instance, the next generation sequencing equipment of MANU is the first laboratory of its kind in the region. In this respect, Macedonia has the necessary conditions to develop a competitive advantage in university research and development. However, to cover the operational costs and to ensure the long term sustainability of the laboratories, the government funding needs to be complemented by funds from the business sector and from international projects. It is therefore necessary to prepare and implement a programme to ensure the sustainability of the laboratories.

b) Measures

(i) Raising the capacities to access and use external funds

The capabilities of both academic institutions and SMEs to use external (primarily EU) funds need to be improved, which will also give an impetus to science-industry cooperation.

First, the Ministry of Education and Science will perform a situational analysis on the availability and accessibility of external funds (governmental, non-governmental and foreign) for R&D and innovation support and for transfer of know-how and technology. The Ministry of Education and Science will keep track of key data and of the most important changes and publish selected calls on the internet.

Second, a programme will be developed to increase applications for external funds. It may not be sufficient to rely on occasional activities. Where possible and needed (e.g. in

the case of FP7 and Eureka), a network of national contact points will serve as providers of information and raise awareness.

Finally, assistance will be provided for the preparation of applications. Firms will be given financial support to hire consultants that have experience with applications for specific funds. In the case of key national and EU programmes, the national contact points will provide basic information related to project preparation and direct applicants to the network of consultants.

(ii) Database/register for laboratories and researchers and a web portal for science-industry cooperation

The Ministry of Education and Science is currently developing a database of laboratories and their respective fields of research and type of equipment they possess. Along with the information on the researchers, it will establish the database for the other initiatives such as virtual technological centers and a web portal for cooperation between the science and industry. This database should be connected with the existing databases.

On the basis of the databases of laboratories and researchers, an interactive web portal will be established for support of the cooperation between the research institutes and businesses for activities such as adaptation of the technology, transfer of knowledge, training and applicative research.

The web portal will enable establishment of connection between the area of specialization and the service offered by the researchers with the needs of the business. Likewise, the companies may announce projects for which they need cooperation with the scientific and research centers.

(iii) Technology parks

The Government will support businesses and the collaboration between businesses and research institutions through technology centres. In particular, the existing and planned laboratories within research institutions will be the core of the technology centres. The new laboratories create opportunities for a variety of business services. In the design and planning related to these laboratories, the opportunities to offer services such as manufacturing extensions, technology adaptation and product testing need to be explored. The use of research equipment needs to be monitored to maximise the benefits for the national innovation system. Ensuring the effective use of the database of laboratories and researchers and of the web portal for science-industry cooperation is also necessary.

(iv) Technology transfer offices and incubators

Existing initiatives covering technology transfer and science-industry cooperation should evolve into several technology transfer offices at universities and/or faculties. When setting up technology transfer offices, it is important for each of them to be able to reach the critical mass of projects. The TTOs will provide patenting support and assist the creation of spin-offs and technology licensing. While at present IPRs are owned by the researcher, the plan is that Universities/TTOs should own IPRs and that researchers will be compensated accordingly. The functions of technology transfer offices should be complemented by incubators that will provide support to academic entrepreneurship and other new technology based firms that cooperate with universities.

(v) Increasing the scientific and technological cooperation with the other countries

The Republic of Macedonia has signed agreements for scientific and technological cooperation with Russia, Ukraine, Belarus, Slovenia, Croatia, Montenegro, Egypt, Turkey, Bulgaria, Austria, Italy, United States of America and People's Republic of China, agreement for cooperation through the Program for Integrative Activities "Integra FM" with France, and draft text of the Agreement on Scientific and Technological Cooperation between the Government of the Republic of Macedonia and the Government of the Republic of Serbia was prepared. Since such agreements contribute to creation of a system of communication and easier cooperation between the Macedonian universities and the universities from the other countries, continuous activities will be undertaken for conclusion of new Agreements for cooperation in these areas with other countries as well, focusing on the countries with highly developed technology.

D.3. Embed FDI and innovative stars into the NIS

a) Rationale and state of affairs

Foreign direct investment (FDI) can have a positive impact on the economy and become an important source of technology transfer. However, in order to benefit from investment as much as possible, Macedonia must attract the right investments and ensure that FDI is embedded in the national innovation system. In particular, to allow for spillovers and to increase the absorptive capacity of firms, multinational enterprises (MNEs) will be embedded into the local production fabric via the establishment of backward and forward linkages to local suppliers and consumers. To support innovation and strengthen human capital, FDI should make use of available skilled labour or offer the potential for the development of skills. Furthermore, the Government will support

the creation of linkages and the cooperation between multinational enterprises as well as the most innovative domestic firm and research institutions.

b) Measures

(i) Matching MNEs with domestic suppliers

The Government will support the matching of MNEs and domestic suppliers by providing information to selected MNEs on suitable domestic suppliers, by providing support services to potential MNE suppliers (including business networks and clusters), by attracting MNEs to invest in Macedonia and by organising networking events and exhibitions.

(ii) Matching FDI with domestic skills

The government will seek to attract FDI in sectors such as ICT where the country has a good supply of skilled labour. Furthermore, by supporting cooperation between potential investors and educational institutions through activities such as curricula development, investments can contribute to the development of new skills.

D.4. Strengthen the linkages with the Diaspora

a) Rationale and state of affairs

The Macedonian Diaspora numbers 447,900 persons, or 21.9% of the population in 2010 according to the World Bank Migration and Remittances Factbook 2011 (World Bank, 2011). The percentage is even higher among skilled people, and amounts to 29.1% of tertiary educated population. Strengthening the linkages with the Diaspora can benefit the economic development of and innovation in the Republic of Macedonia in a number of ways. Linking domestic researchers and Macedonian researchers abroad can result in joint research projects, allowing the domestic research system to access the knowledge and the network of the scientific Diaspora. On the other hand, the scientific Diaspora can maintain linkages to Macedonia, making it eventually easier and more likely to return home. Furthermore, Macedonian businesses might benefit from the contacts, knowledge of foreign markets and possibly access to finance of the Diaspora. The government has initiated the E-Diaspora project in order to strengthen linkages with Diaspora members that may be interested to invest in Macedonia.

b) Measures

(i) Scientific network

An internet-based platform can be a cost-effective way to link the domestic research community with the scientific Diaspora, thereby facilitating contacts and flows of knowledge and ideas from the Diaspora to the home country. Such a portal can at the same time provide information about developments in the Republic of Macedonia to the Diaspora members and include information on opportunities for co-operation with institutions or companies. The participation of the Diaspora in the domestic economy would also provide Macedonian companies and researchers with privileged access to institutions and companies where the members of the Diaspora work. Good information flows can also create business opportunities and potentially lead to the emergence of new businesses involving Diaspora members.

An example of such a portal, with only part of the functionalities described above, is the Croatian Connect Portal, constructed as a “virtual marketplace for education and science” (<http://portal.connect.znanost.org/>).

(ii) Diaspora short term stays in the home country

Scientists in the Western world are entitled to sabbatical leave. A sabbatical leave provides scientists with an opportunity to spend a significant amount of time to work on a topic of his or her choice. This represents an opportunity to attract highly skilled members of the Diaspora to the home country at very low costs since these scientists' salaries are paid by their foreign institution during the sabbatical leave.

However, this implies organization of potential interesting challenges for these qualified people, and a form of non-pecuniary recognition of the value they carry (roles, honors etc.)

An example of such initiative is “30 best Serbian entrepreneurs under 30”, an award for young entrepreneurs from the Serbian Diaspora organized by the “international conference for young leaders from the Diapsora”, an initiative of the Serbian Government.

(iii) Joint research projects

As a third step, a fund will be established, to finance joint research and exchange programmes. Croatia was able to create such a network and a fund as part of a donor initiative (Unity through Knowledge Fund: <http://www.ukf.hr/>).

(iv) Return programme

In the long term, one should consider organising specific conditions for returnees. This is a relatively costly measure as long as the differences in salary scales remain large

between the homeland and the countries of emigration. However, such movements have been observed either through heavy subsidies by the government (as in Korea in the late 1960s) or through the exploitation of business cycles (such as the current wave of Portuguese scientists seeking employment in Brazil).

In the short to medium term, an important and cost-effective option to attract skilled Diaspora members is the further improvement of the business climate, which will allow successful entrepreneurship and reward performance. Better linkages and information flows on domestic business opportunities are other important elements to foster the return of Diaspora members.

V. Action Plan for 2013-2015 – Implementing the Innovation Strategy

The Action Plan outlines in detail the policy measures that will be used in the next three years to implement the Innovation Strategy. It takes into account existing initiatives and goes beyond where possible.

Average budget estimates per annum are included.

Please note: since the Agency for Technology and Innovation has not been founded yet, it is included with an asterisk (*).

A. Enhance the business sector's propensity to innovate

A.1. Raise SMEs' awareness of on the benefits of innovation

INFORMATION AND BROKERAGE EVENTS

Responsible institution: Ministry of Economy

Cooperating institutions: Ministry of Education and Science, business centres, Chambers of Commerce, Agency for Entrepreneurship Promotion, Enterprise Europe Network

Time frame: 2013 - 2015

Introduction-description of the project: Information events will be used to educate SMEs on the benefits of innovation, available incentives and good practices in innovation management. Brokerage events will be used to stimulate networking between companies, science-industry collaborations and the internationalisation of Macedonian companies.

Project targets: Dissemination of information about innovation and on available policy measures. Creation of new business opportunities for current and potential innovators.

Expected results: Improved innovation-related knowledge and motivation of entrepreneurs. Building relationships between innovative firms and other actors within the national innovation system.

Activities: 5-7 events per year (where possible, focused on specific innovation policy measures)

Indicators for implementation-realisation: Number of events. Number of participants. Evaluation of events by participants. Follow-up activities.

COMPETITIONS AND AWARDS – BUSINESS START-UP COMPETITION

Responsible institutions: Ministry of Economy, Ministry of Education and Science

Cooperating institutions: Business centres and incubators, universities, schools, Business Start-up Centre

Time frame: 2013 - 2015

Introduction-description of the project: The project aims at improving the number and quality of innovative start-ups founded by students and young entrepreneurs.

Project targets: Promotion of entrepreneurship. Entrepreneurial learning. Creation of conditions for innovative start-ups.

Expected results: Increased competences of students and young entrepreneurs. Setting-up new innovative start-ups with a growth potential.

Activities: Call for proposals. Initial evaluation of proposals. Education and training for competitors. Submission and presentation of final business plans. Selection of winners. Provision of technical assistance to winners. Foundation of new firms.

Indicators for implementation-realisation: Number of project proposals. Number of firms founded. Number of jobs in start-ups. Number of firms which survived at least three years.

COMPETITIONS AND AWARDS – TRIPLE HELIX PARTNERSHIPS BETWEEN SCIENCE, BUSINESSES AND GOVERNMENT

Responsible institutions: Ministry of Economy, Ministry of Education and Science

Cooperating institutions: Agency for Entrepreneurship Promotion, Chambers of Commerce, Invest Macedonia, business centres, universities, other line ministries

Time frame: Pilot in 2013; Full roll-out: 2014-2015

Introduction-description of the project: The project aims at improving the linkages between businesses, academia and the local government resulting in an improved national innovation system.

Project targets: Better cooperation and networking between the academia, business and local government. Capacity building of officials carry out such projects.

Expected results: Commercialisation of new products or services. Building personal relationships between businesses, academia and local government.

Activities: Initial seminar to share best practice from transition and OECD countries. Invitation to Macedonian consortia to submit project proposals. Selection of the top 3 proposals that will receive technical assistance for implementation.

Indicators for implementation-realisation: Number of project proposals. Number of concrete cooperation outcomes.

A.2. Establishment of a Fund for Innovation and Technological Development (FIT)

Responsible institutions: Office of the Deputy Prime Minister in the Government of the Republic of Macedonia in charge of Economic Affairs

Time frame: 2013

Introduction-description of the project:

Through this Fund grants will be provided for innovations, technical assistance for the companies for facilitation of the access to the regional funds, conditioned loans (royalty), equity investments, financial assistance for research and development and the like.

Project targets: The Innovation Fund is established in order for additional sources of financing the small and medium enterprises to be provided, with a special accent on innovation.

Indicators for implementation-realisation: Number of received applications for financing, number of financed projects for innovation.

Activities: Announcing a call, collection of applications, process of evaluation, approved projects for co-financing, monitoring the results, public presentation of the results.

TECHNICAL ASSISTANCE (CONSULTANT SERVICES) FOR SMALL AND MEDIUM ENTERPRISES

Responsible institutions: Fund for Innovation and Technical Development

Time frame: 2013 - 2015

Introduction-description of the project:

The objective of the project is facilitation of the access of the small and medium enterprises to external services such as: external research and development, testing, design, instruction and training, market research, business consulting for writing business plans or feasibility studies.

Project targets: Greater access of the small and medium enterprises to external professional services. Increase in the capabilities of the personnel from the small and medium enterprises through adult education. Development of consultant and educational services.

Expected results: Greater use of the external services by the small and medium enterprises.

Indicators for implementation-realisation: Number of applications for receiving vouchers. Number of used vouchers.

Activities: Kick-off event. Media campaign. Collection of applications. Evaluation of the applications and approval of vouchers. Use of the vouchers. Evaluation of the service providers.

SUPPORT FOR ESTABLISHMENT OF UNIVERSITY SPIN OFF COMPANIES

Responsible institutions: Fund for Innovations and Technological Development

Time frame: 2013 – 2015

Introduction-description of the project:

Provision of financial support for establishment of university spin off companies –new companies established with an aim of commercializing the knowledge that results from scientific-research and development research projects of the universities.

Project targets:

Stimulation of the entrepreneurial spirit among students and professors. Strengthening of the cooperation between the academia and business sector.

Expected results:

Establishment of University spin off companies.

Indicators for implementation-realisation: Number of established spin off companies. Adopted legislation for creation of University spin off and research centers. Developed awareness among the target group about the significance of establishing this type of cooperation.

Activities: Adoption of the legislation. Announcing a call. Evaluation of the draft projects. Concluding contracts. Observation and evaluation.

GRANTS FOR COMMERCIALIZATION OF IIR PROJECTS

Responsible institutions: Funds for Innovation and Technological Development

Time frame: 2014-2015

Introduction-description of the project:

Co-financing of development and research projects for small and medium enterprises by announcing annual competitions.

Project targets:

More investments in development and research projects and activities related to innovations, through co-financing of small and large development research projects.

Indicators for implementation-realisation: Number of received applications for co-financing, number of co-financed development research projects.

Expected results:

Improved cooperation and connection between science and economy.

Activities: Announcing a competition, collection of applications, process of evaluation, approved projects for co-financing, monitoring of the results, public

presentation of the results.

GRANTS AND CONDITIONED LOANS (ROYALTY) FOR COMMERCIALIZATION OF R&D PROJECTS

Responsible institutions: Fund for Innovation and Technological Development

Time frame: 2014 – 2015

Introduction-description of the project:

Facilitation of the access to grants of the micro and small enterprises. With the introduction of grants and royalty for the projects of the micro and small enterprises, commercialization of the research and development, cooperation with the international companies and organizations will be stimulated, as well as further development of innovative knowledge-based companies.

Project targets: Greater access of the micro and small enterprises to grants aimed at stimulation and commercialization of R&D.

Expected results: Greater access to grants

Activities: Collection of projects (for grants), evaluation and approval of the projects and monitoring of project implementation.

Indicators for implementation-realisation: Total value of the approved grants and total number of supported micro and small enterprises that possess technological innovation or a potential for creation of new intellectual property.

SUPPORT OF ECO INNOVATIONS

Responsible institutions: Fund for Innovation and Technological Development

Time frame: 2014 – 2015

Introduction-description of the project:

Provision of financial support to the enterprises for use of clean technologies and production of ecological products, with an aim of environmental protection, as well as increase in the awareness of the enterprises about the economic benefits from introduction of ecologically clean production and greater competitiveness of the market with the sale of eco-products.

Project targets: Increased access of the enterprises to grants and credits in order for stimulation of ecologically clean production.

Activities: Collecting projects (for grants), evaluation and approval of the projects and monitoring of project implementation.

Indicators for implementation-realisation: Total value of approved grants and total number of supported enterprises.

A.3. Encourage private investment in R&D and innovation

DEDUCTION OF OR EXEMPTION FROM THE TAX AND CUSTOMS DUTIES FOR RESEARCH AND DEVELOPMENT

Responsible institutions: Ministry of Finance and Ministry of Education and Science

Time frame: 2013 – 2015

Introduction-description of the project:

The project anticipates deduction of or exemption from the tax and customs duties on the imports of equipment for research and development.

Project targets: Increase in the investment in equipment for research and development/innovative activities.

Expected results: Increase in the investments in research and development.

Indicators for implementation-realisation : Total value of the investments.

Activities: Revision of customs tariffs. Determination of tax exemptions.

CREDIT GUARANTEES / SUBSIDISED LOANS

Responsible institution: Ministry of Finance

Cooperating institutions: Macedonian Bank for Development Promotion, Agency for Entrepreneurship Promotion, Chambers of Commerce, Agency for Technology and Innovation*

Time frame: 2013 - 2015

Introduction-description of the project: The project aims at facilitating SME access to bank credits. Credit guarantees will assist access credit from commercial banks, whereas the Macedonian Bank for Development Promotion will offer credit lines targeted at the commercialisation of innovation.

Project targets: Increased SME access to debt finance for the commercialisation of innovation.

Expected results: Increased access to credit for innovative SMEs.

Activities: Kick-off event. Collection of applications (for credit guarantees and loans). Evaluation of applications. Contracting and implementation of projects. Evaluation of projects.

Indicators for implementation-realisation: Total value of credit guarantees. Total value of loans enabled by credit guarantees. Total value of investments supported by credit guarantees. Total value of loans for innovative projects granted by the Macedonian Bank for Development Promotion.

SUPPORTING ACCESS TO REGIONAL FINANCIAL INSTRUMENTS

Responsible institution: Ministry of Economy

Cooperating institutions: Macedonian Bank for Development Promotion, Agency for Entrepreneurship Promotion, Agency for Technology and Innovation*

Time frame: 2013 - 2015

Introduction-description of the project: The project aims at facilitating SME access to the Enterprise Development and Innovation Facility (EDIF) funds, including investment readiness schemes and promotion activities aimed at the EDIF fund managers.

Project targets: Increased SME access to EDIF funds (Innovation fund, Expansion fund, and Credit Guarantee scheme).

Expected results: Increased investment readiness of innovative SMEs in Macedonia. Increased access to finance for innovative SMEs.

Activities: Kick-off event. Collection of applications. Initial evaluation of projects. Provision of technical assistance.

Indicators for implementation-realisation: Number of project applications. Number of successful project applications. Total value of projects that received EDIF support. Value of projects supported through the Innovation Fund. Value of projects supported through the Expansion Fund. Value of projects supported through the Credit Guarantee Scheme.

BUSINESS ANGEL NETWORK

Responsible institution: Ministry of Economy

Cooperating institutions: Agency for Entrepreneurship Promotion, Agency for Technology and Innovation*, Enterprise Europe Network, CIRKO

Time frame: 2013 - 2015

Introduction-description of the project: The project will organise information dissemination about angel investing, and facilitate the creation and development of a business angel network.

Project targets: Increased knowledge about angel investing. Increased protection of minority shareholders. Increased SME access to equity finance.

Expected results: Development of a business angel network. Investments by business angels into innovative start-ups.

Activities: Improving the protection of minority shareholders. Setting up a business angel network. Information dissemination. Launching event. Collection of applications. Evaluation of projects. Follow-up after the investment.

Indicators for implementation-realisation: Set up of a business angel network. The number of business angels within the network. Number of project applications. Number of investments by business angels. Total value of investments by business angels.

B. Strengthen human resources for innovation

B.1. Adapt education policy to develop the skills needed for innovation

SKILLS AND TRAINING NEEDS ANALYSIS

Responsible institution: Ministry of Education and Science (skills needs analysis) Ministry of Economy (training needs analysis)

Cooperating institutions: Employment Services Agency, VET Centre, Agency for Entrepreneurship Promotion, Chambers of Commerce, Ministry of Labour

Time frame: 2012 (ongoing) – onwards

Introduction-description of the project: The Employment Services Agency already implements a regular assessment of skills needs based on 2,960 SMEs in 15 different sectors. This existing assessment will be continued and further improved in order to include longer term trends. An economic research institution will be included in implementation. Training needs analysis will continue to be carried out under the responsibility of the Ministry of Economy.

Project targets: Monitoring of skills and training needs of SMEs.

Expected results: Implemented skills and training needs analysis.

Activities: Skills needs analysis. Training needs analysis.

Indicators for implementation-realisation: The response rate. Feedback of participants.

NATIONAL COUNCIL FOR HIGHER EDUCATION, INNOVATION AND TECHNOLOGIES

Responsible institutions: Ministry of Education and Science

Time frame: 2013 (establishment) – onwards

Introduction-description of the project: The Council will facilitate the dialogue among the educational institutions, businesses and government institutions.

Project targets: unification of the activities of several existing bodies (National Committee for Scientific and Research Activity, Committee for Technological Development and Board of Ethics), integration of their competences in order to have a greater control and easier following of the undertaken activities.

Indicators for implementation-realisation: Recommendations for better cooperation of the stakeholders in the competitiveness of the economy – business sector, academic sector and government institutions. Assessment of implementation of the recommendations.

Activities: meetings of the Council of Higher Education, Innovation and Technologies.

CURRICULA AND QUOTA ADJUSTMENTS

Responsible institution: Ministry of Education and Science

Cooperating institutions: Bureau for the Development of Education, Ministry of Labour, Employment Services Agency, VET Centre, educational and training institutions

Time frame: 2013 – onwards

Introduction-description of the project: Education curricula and quotas will be adjusted to the needs of the economy.

Project targets: Improved labour market performance. Better employability of the labour force.

Expected results: Improvement in the functioning of the labour market.

Activities: Evaluation of curricula and quotas. Adjustments of curricula and quotas based on skills needs analysis and on dialogue in the Skills Council.

Indicators for implementation-realisation: Number of adjusted curricula. Average duration of unemployment. Employment rate. Unemployment rate.

ENSURE THE QUALITY OF TEACHERS AND TRAINERS

Responsible institution: Ministry of Education and Science

Cooperating institutions: (Bureau for the Development of Education), VET Centre, educational and training institutions

Time frame: 2013 – onwards

Introduction-description of the project: The project will involve pre-service and in-service training accreditation of institutions and programmes, as well as implementation of external and internal quality assurance systems.

Project targets: Improved quality of teachers and trainers. Better employability of the labour force.

Expected results: Improvement in the functioning of the labour market.

Activities: Self-assessment of educational institutions. External assessment of educational institutions. Student assessments.

Indicators for implementation-realisation: Satisfaction of students / trainees. Percentage of trainees getting employment within 6 months. Average salary of students / trainees.

SUPPORT FOR WRITING AND SUBMITTING INTERNATIONAL PATENT APPLICATIONS

Responsible institutions: Ministry of Economy, State Office for Industrial Property

Time frame: 2013-2015

Introduction-description of the project:

The Ministry of Economy will undertake measures for training of the legal representatives to write and submit quality international patent applications.

Project targets: Increase in the number of international patent applications by citizens of the Republic of Macedonia.

Expected results: improvement of the innovations in the Republic of Macedonia

Indicators for implementation-realisation: Number of trained legal representatives, number of submitted international patent applications by citizens of the Republic of Macedonia.

Activities: Announcement of a call, collection of applications, process of training.

B.2. Stimulating measures for the educational development of the the talented students and measures for teachers engaged in the preparation process for the most successful students

COMPETITION FOR PRIMARY SCHOOL PUPILS AND SECONDARY SCHOOL STUDENTS

Responsible institutions: Ministry of Education and Science

Time frame: 2013 – 2015

Introduction-description of the project:

Preparation of a strategy/plan for organization of annual competitions for primary and secondary schools both at a level of municipalities and the Republic of Macedonia in mathematics, physics, chemistry, and other natural sciences and introduction of stimulative measures for the most successful pupils and students and the teachers that helped them in the preparations.

Project targets: Stimulation of the intellectual development of the talented students.

Expected results:

Improvement in the results of the Macedonian participants in international competitions.

Indicators for implementation-realisation:

Number of organized competitions. Number of received awards in national competitions. Number of received awards in international competitions.

Activities:

Revision of the areas and the manner of organization of the competitions so far. Preparation of a plan/strategy for organization of the competitions for the primary and secondary schools. Determination of the degree and manner in which the most successful participants and teachers will be rewarded.

COMPETITION FOR INNOVATION

Responsible instructions: Ministry of Education and Science, Ministry of Economy

Time frame: 2014 – 2015

Introduction-description of the project:

Organization of international competition for innovation for primary school pupils and secondary school students.

Project targets:

Stimulation of the intellectual development of the talented students. Stimulation of the creativity among the young population. Establishment of a mechanism for gathering ideas that have a potential for commercialization by the companies.

Expected results:

Continuous organization of international competitions for innovations. Continuous increase in the number of participant countries in the competitions. Continuous increase in the number of companies present in the competitions. Established practice for commercialization of the students' innovative projects.

Indicators for implementation-realisation:

Number of organized competitions. Number of participant countries in the competitions. Number of foreign participants in the competitions. Number of received awards at the competitions. Number of companies present at the

competitions. Number of commercialized ideas/projects.

Activities:

Preparation of a plan/strategy for organizing the competitions for innovation for the primary and secondary schools. Promotion of the competition in the primary and secondary schools in Macedonia and beyond. Promotion of the competition before the business community of the Republic of Macedonia as a mechanism for obtaining ideas for improvement of one's own products and services. Determining the degree and manner of rewarding the most successful students and teachers.

VIRTUAL BUSINESS GAME THAT SIMULATES THE EVERYDAY BUSINESS ACTIVITIES OF SME

- Responsible institutions: Ministry of Education and Science and Universities in the Republic of Macedonia
- Time frame: 2013-2015

Introduction-description of the project:

- The Ministry of Education and Science in cooperation with the Universities in the Republic of Macedonia will create a virtual game that simulates the everyday life of a company for a period longer than six months. The students countrywide will be organized in teams and their capabilities to manage businesses, make decisions and work together will be tested.
- Project targets: Development of an entrepreneurial culture among the students
- Expected results: development of the entrepreneurship among the young people in the Republic of Macedonia.

Indicators for implementation-realisation:

- Number of teams that applied.

Activities: Creation of a virtual game, registration of the teams, competitions, public presentation of the results and giving awards.

B.3. Increase the quality of vocational training and promote lifelong learning

INCREASE CAPACITIES OF VET CENTRE AND ADULT EDUCATION CENTRE

Responsible institution: Ministry of Education and Science

Cooperating institutions: VET Centre, Adult Education Centre

Time frame: 2013 – onwards

Introduction-description of the project: The project will involve an increase in the human, organisational and financial capacities of the VET Centre and Adult Education Centre, thereby enabling them to fulfil their mission as vehicles of vocational training and lifelong learning in Macedonia.

Project targets: Increased availability of vocational and lifelong learning programmes in Macedonia. Better employability of the labour force.

Expected results: Improvement in the functioning of the labour market.

Activities: Strategic planning for VET Centre / AE Centre. Strategy implementation (with appropriate budget increase).

Indicators for implementation-realisation: Number of employees and budget of the VET Centre. Number of employees and budget of the Adult Education Centre. Number of programmes and students at the VET Centre. Number of programmes and students at the Adult Education Centre.

INCREASE THE ATTRACTIVENESS OF THE RESEARCH ACTIVITY

Responsible institutions: Ministry of Education and Science

Time frame: 2013 – 2015

Introduction-description of the project: Introduction of stimulative measures for increasing the attractiveness of the scientific and research activity, that is, for retaining the domestic researchers and attracting foreign PhD candidates and researchers.

Project targets:

Popularization of the capacities of the University laboratories. Better use of the equipment of the laboratories for performance of the scientific-research and applicative activity.

Expected results:

Increased attractiveness of the scientific-research activity in the Republic of Macedonia. Increased number of enrolled PhD candidates, both domestic and foreign. Increased number of employed researchers.

Indicators for implementation-realisation:

Created web site for promotion of the capacities of the laboratories. Organized promotional activities/events. Number of enrolled PhD candidates, both domestic and foreign. Number of employed researchers.

Activities:

Preparation of an action plan that will contain promotional activities in the country and abroad for popularization of the capacities of the laboratories and determining concrete stimulative measures for retaining the domestic researchers and attracting foreign PhD

candidates and researchers.

SUPPORT OF THE SCIENTISTS FOR THEIR PARTICIPATION IN SCIENTIFIC MEETINGS

Responsible institutions:

Ministry of Education and Science

Time frame: 2013 – 2015

Introduction-description of the project:

Support of the researchers and scientists for participation in scientific meetings, conferences and study visits abroad.

Project targets:

Development of the careers of the researchers and scientists.

Expected results:

Increased level of scientific excellence.

Indicators for implementation-realisation:

Number of supported researchers and scientists for participation in scientific meetings, seminars, conferences and study visit abroad.

Activities:

Adoption of a Regulation on the Procedure and Specific Criteria for Financing the Participation of the Researchers and Scientists from the Republic of Macedonia in scientific meetings, seminars, conferences and study visits abroad, as well as organizing scientific meeting that would be attended by foreign researchers and scientists.

B.4. Make tertiary education more innovation-oriented

INNOVATION AND ENTREPRENEURSHIP CLASSES

Responsible institution: Ministry of Education and Science

Cooperating institutions: Employment Services Agency, universities and professional schools

Time frame: 2013 - 2015

Introduction-description of the project: The project involves offering innovation classes and training students in the entrepreneurial knowledge, skills, and abilities.

Project targets: Increased knowledge, skills and motivation of students to engage in entrepreneurship and innovation.

Expected results: Better knowledge and understanding of entrepreneurship and innovation at universities.

Activities: Dialogue between universities, the MoES and chambers of commerce (in the Skills Council). Adjustment of curricula. Setting up training programmes. Implementation of innovation and entrepreneurship classes.

Indicators for implementation-realisation: The number of programmes. The number of participants. Satisfaction of students.

INTERNSHIP PROGRAMMES

Responsible institution: Ministry of Education and Science

Cooperating institutions: universities and professional schools, Chambers of Commerce

Time frame: 2012 - onwards

Introduction-description of the project: Internship programmes of 3-6 months during or immediately after higher education studies will be made available to a higher number of students. MoES, universities and chambers of commerce will set up a joint committee that will work on the promotion of internships.

Project targets: Increased knowledge and skills of students.

Expected results: Better employability of students.

Activities: Adoption of the Law on internships (in 2012). Setting up a committee for the promotion of internships. Implementation of internships. Monitoring of the programme.

Indicators for implementation-realisation: The number of interns. Average duration of unemployment for those who completed an internship.

COOPERATIVE INDUSTRIAL DIPLOMAS, MASTER'S DEGREES AND PHDS

Responsible institutions: Ministry of Education and Science, Office of the Deputy President of the Government of the Republic of Macedonia in charge of Economic Affairs, Directorate for Technological-Industrial Development Zones, Universities, Chambers of Commerce

Time frame: Pilot stage from 2013-2015

Introduction-description of the project: Institutional and financial support will be provided to the students at Masters and PhD studies who are either employed by the companies or should be employed by the industry after the completion of the PhD research.

Project targets: Increased applicability of the academic research. Creation of pre-conditions for better cooperation between the science and industry.

Expected results: Building personal relations between the science and industry. New projects for cooperation in research and development.

Indicators for implementation-realisation: Number of diplomas, Master's and PhD degrees on-going/already received.

Activities: Institutional reforms that will enable the joint diplomas. Setting up a new programs for scholarships. Implementation of a new program for scholarships. Monitoring.

SETTING UP ADVISORY BOARDS AT UNIVERSITIES

Responsible institution: Ministry of Education and Science

Cooperating institutions: Universities

Time frame: 2013 - onwards

Introduction-description of the project: Public universities will be encouraged to set up advisory boards which would include private sector representatives.

Project targets: Facilitation of science-industry collaboration, accountability and responsiveness to the needs of the labour market.

Expected results: More effective functioning of universities. Building personal relationships between science and industry. Improved functioning of the labour market.

Activities: Setting up advisory boards. Meetings of advisory boards.

Indicators for implementation-realisation: Feedback from advisory board members.

C. Create a regulatory environment in support of innovation

C.1. Provide an effective regulatory environment for academics and research institutions

LEGISLATION FOR THE FUND FOR INNOVATION AND TECHNOLOGICAL DEVELOPMENT

Responsible institutions: Office of the Deputy President of the Government of the Republic of Macedonia

Time frame: 2013

Description: Adoption of Legislation regarding the Fund for Innovation and Technological Development

Project targets: successful setting up and functioning of the Fund for Innovation and Technological Development

Indicators for implementation-realisation: Prepared and adopted Law on the Fund for Innovation and Technological Development

Activities: Analysis of the current situation. Comparative analysis of the best practices. Amendments to the legislation.

ALLOCATION OF RESEARCH FUNDS ON A COMPETITIVE BASIS

Responsible institution: Ministry of Education and Science

Cooperating institutions: Universities

Time frame: 2012 (ongoing) - onwards

Introduction-description of the project: The Ministry of Education and Science already distinguishes between basic research projects and R&D projects when allocating funds. The

criteria for the allocation of funds will be further improved, taking the patent history of applicants and the potential for patents into account.

Project targets: Effective and efficient use of public R&D resources. Promotion of scientific excellence. Facilitation of science-industry collaboration. Development of R&D projects with innovative potential.

Expected results: Increase of public R&D resources. Scientific excellence. Collaborative research projects with a strong commercialisation potential.

Activities: Publishing calls. Evaluation of project proposals. Contracting. Monitoring and evaluation.

Indicators for implementation-realisation: Government budget appropriations or outlays for research and development (GBAORD). Number of CC publications. Number of patents. Number of new products. Number of new processes. Number of spin-offs.

INCENTIVE BASED SALARY AND CAREER PATH OF ACADEMICS

Responsible institutions: Ministry of Education, Office of the Deputy President of the Government in charge of Economic Affairs, Universities

Time frame: 2013 – on going

Project targets: Introduction of criteria for determining the amount of the salaries of the academics based on the performance and output of the research.

Expected results: Increased level of scientific excellence. Development of scientific-research and development-research activity. Development of young scientists.

Indicators for implementation-realisation: Number of publications. Number of patents.

Activities: Defining criteria according to which the amount of the academic's salaries will be determined.

COHERENT IPR REGULATION FOR PUBLIC RESEARCH INSTITUTIONS

Responsible institution: Ministry of Education and Science

Cooperating institutions: State Office for Intellectual Property, universities, Ministry of Labour

Time frame: 2013

Introduction-description of the project: The regulation will clarify the IP rights between academic personnel and research institutions facilitating the commercialisation of research results. The IP rights of any innovation or patent invented within the university labs will belong to the Technology Transfer Centres in the respective University and researchers will receive a share of income from commercialisation.

Project targets: Clarification of IP rights. Commercialisation of research results.

Expected results: Simple and efficient commercialisation of research results. Increased income of academic institutions.

Activities: Drafting of the IPR regulation. Enactment of the regulation.

Indicators for implementation-realisation: Number of patent applications. Number of patents. Income from technology licensing. Number of spin-offs.

REGULATION OF ENTREPRENEURIAL LEAVE

Responsible institutions: Ministry of Education and Science, Universities

Time frame: 2013 – 2015

Introduction-description of the project: The Project will support University spin-off and will create legislation that will enable the researchers to be engaged in entrepreneurial activities either part time or to take entrepreneurial leave that would last maximum for two years.

Project targets: Stimulation of the scientific excellence, innovation and cooperation between science and industry. Commercialization of the results from the research.

Expected results: Improved commercialization of the results from the research.

Indicators for implementation-realisation: Number of university spin-offs.

Activities: Adoption of legislation for regulation of the entrepreneurial leave and support of spin-off.

C.2. Adapt public procurement practices to encourage innovative solutions

INTRODUCTION OF FUNCTIONAL REQUIREMENTS INTO PUBLIC PROCUREMENT

Responsible institution: Ministry of Finance

Cooperating institution: Ministry of Economy

Time frame: 2013

Introduction-description of the project: The project will involve the revision of legislation related to public procurement to include functional requirements.

Project targets: Improved efficiency of public procurement. Facilitation of innovative solutions through public procurement.

Expected results: Reduced public expenditures. Development of innovative products and services.

Activities: Revision of the current legislation covering public procurement and public-private partnerships. Provision of training to public procurement officers in institutions that will use functional requirements and to bodies that control public procurement activities.

Indicators for implementation-realisation: Number of projects in which functional requirements have been used. Estimated savings. Number of new products and services.

C.3. Provide for a competitive business environment

MONITORING AND IMPROVING THE BUSINESS ENVIRONMENT FOR SMEs

Responsible institution: Ministry of Economy

Cooperating institution: Invest Macedonia

Time frame: 2013 - onwards

Introduction-description of the project: The regulatory business environment for SMEs is assessed and monitored in the context of the SME Policy Index project. The SME Policy Index is a benchmarking tool developed by the OECD and the EC for EU pre-accession economies to monitor and evaluate progress in implementing the Small Business Act for Europe.

Project targets: Improved policy framework and business environment for SMEs.

Expected results: New firm creation. Higher firm growth. Attraction of foreign investments.

Activities: Assessment of the regulatory environment and support programmes for SMEs. Adapt regulation and institutional framework to improve the business environment for SMEs.

Indicators for implementation-realisation: Number of new firms. Net job creation. FDI inflows. SME Policy Index Score.

IMPLEMENTATION OF COMPETITION POLICY

Responsible institution: Commission for Protection of Competition

Cooperating institution: Ministry of Economy

Time frame: 2013 - onwards

Introduction-description of the project: The project will involve the systematic monitoring and improvements of the implementation of competition policy.

Project targets: Increased market competition. Improved business environment.

Expected results: Reduction of barriers to entry.

Activities: Preliminary analysis of competitive environment. Monitoring of competition policy (annual reports).

Indicators for implementation-realisation: Concentration in selected sectors. Number of decisions related to competition (administrative and misdemeanour procedures). The share of state aid in GDP.

D. Increase knowledge flows between innovation actors

D.1. Foster business networks and clusters

EVALUATION AND PRIORITISATION OF CLUSTER SUPPORT

Responsible institution: Ministry of Economy

Cooperating institution: Agency for Entrepreneurship Promotion

Time frame: 2012 (evaluation), 2013 – onwards (cluster support)

Introduction-description of the project: The project will involve the creation of an inventory of existing cluster and networks. Such initiatives will be evaluated in order to prioritise resources

available for support. The prioritisation will be based on the evaluation of existing initiatives, the quality of cluster strategies and the innovation potential of firms in clusters.

Project targets: Development of sustainable clusters. Job creation within clusters. Increased capability for innovation within clusters.

Expected results: Growth of clusters. Increased sustainability of clusters.

Activities: Evaluation of existing clusters. Selection of clusters based on evaluation and on cluster strategy. Further development of cluster strategies for each selected cluster. Implementation of cluster strategies. Monitoring of cluster activities.

Indicators for implementation-realisation: Number of clusters. Number of jobs within a cluster. Total revenues of cluster members (by cluster). Share of exports in revenues (by cluster). New products or processes developed within a cluster.

PARTICIPATION IN TRADE FAIRS

Responsible institution: Ministry of Economy

Cooperating institutions: Agency for Entrepreneurship Promotion, Chambers of Commerce, Invest Macedonia

Time frame: 2013 – onwards

Introduction-description of the project: In line with the export promotion programme, the project involves the provision of subsidies for participation in trade fairs and international business events to clusters, networks and individual firms.

Project targets: Improved internationalisation of business activities of clusters, networks and individual firms.

Expected results: Lowering the costs of entry into foreign markets.

Activities: Collection of applications. Evaluation of applications. Provision of subsidies. Monitoring of follow-up activities.

Indicators for implementation-realisation: Number of events for which support has been given. Number of follow-up projects.

D.2. Increase knowledge flows and interactions between research institutions and businesses

RAISING THE CAPACITIES TO ACCESS AND USE EXTERNAL FUNDS

Responsible institution: Ministry of Education and Science

Cooperating institutions: Ministry of Economy, universities, Enterprise Europe Network

Time frame: 2013 – onwards

Introduction-description of the project: The project aims to help academic institutions and SMEs access external (primarily EU) funds for innovation. This is also expected to give an impetus to science-industry cooperation.

Project targets: Increased capability of Macedonian applicants. Increased availability of resources. Improved science-industry collaboration.

Expected results: Increased number and quality of externally-funded (EU) projects.

Activities: Situational analysis on the availability and accessibility of external funds. Information dissemination (web, events). Provision of assistance for the preparation of applications (financial support for firms to use consultants that have experience with the application preparation).

Indicators for implementation-realisation: Number of projects with Macedonian partners. Budget allocated to Macedonian partners.

DATABASE / REGISTER FOR LABORATORIES AND RESEARCHERS & WEB PORTAL FOR SCIENCE – INDUSTRY COOPERATION

Responsible institution: Ministry of Education and Science

Cooperating institutions: Universities

Time frame: 2013 (setting up) – onwards (maintenance)

Introduction-description of the project: The project aims to develop a database of laboratories, their fields of research, equipment and research staff, as well as an interactive web portal that will support the cooperation between research institutes and businesses via activities such as technology adaptation, knowledge transfer, training and applied research.

Project targets: Improved science-industry collaboration.

Expected results: Increased number and quality of collaborative R&D projects.

Activities: Development of the database. Development of the web portal. Information dissemination.

Indicators for implementation-realisation: Development and use of the database. Development and use of the web portal.

TECHNOLOGY PARKS

Responsible institution: Ministry of Education and Science

Cooperating institutions: Universities

Time frame: 2013 – onwards

Introduction-description of the project: The project aims to develop technology centres within universities and to use laboratories for offering manufacturing extensions, technology adaptation and product testing.

Project targets: Improved science-industry collaboration.

Expected results: Increased innovation in SMEs. More frequent commercialisation of innovations. Increased number and quality of collaborative R&D projects.

Activities: Needs assessment. Creation of technology centres. Information dissemination. Monitoring of the use of equipment. Provision of support to projects.

Indicators for implementation-realisation: Use of the laboratories by external users (percentage of time). Number of project implemented within technology centres. Income from such projects.

TECHNOLOGY TRANSFER OFFICES AND INCUBATORS

Responsible institution: Ministry of Education and Science

Cooperating institutions: Universities, State Office for Intellectual Property

Time frame: 2013 – onwards

Introduction-description of the project: Major Universities will establish TTOs and incubators in collaboration with the MoES and the SoIP. The TTOs will provide patenting support and assist in spin-off creation and technology licensing. Incubators will provide a nurturing environment for spin-offs.

Project targets: TTOs will facilitate science-industry collaboration by supporting researchers and other users who want to commercialise research. They will be a liaison for industry partners interested in commercialising technologies developed at academic institutions.

Expected results: Establishment of a certain number of functional TTOs and incubators at universities. Improvements in technology transfer and academic entrepreneurship.

Activities: Needs assessment and consultation with stakeholders. Setting-up of TTOs and provision of technical assistance. Information dissemination. Monitoring.

Indicators for implementation-realisation: Number of TTOs established. Number of incubators established. Number of patent applications and approved patents, licences and spin-offs.

D.3. Embed FDI and innovative stars into the NIS

MATCHING MNES WITH DOMESTIC SUPPLIERS

Responsible institution: Ministry of Economy

Cooperating institutions: Invest Macedonia, Chambers of Commerce, Agency for Entrepreneurship Promotion

Time frame: 2013 – onwards

Introduction-description of the project: The Government will support the matching of MNEs (operating within Macedonia and abroad) and domestic suppliers.

Project targets: Increased competitiveness of domestic SMEs. Internationalisation of Macedonian SMEs. Attraction of FDI.

Expected results: Establishment of business linkages between Macedonian suppliers (SMEs, clusters and business networks) and MNEs operating in Macedonia and abroad.

Activities: Needs assessment. Provision of support services to potential MNE suppliers (including business networks and clusters). Attraction of MNEs to invest in Macedonia. Networking events and exhibitions.

Indicators for implementation-realisation: FDI inflows. Number of networking events. Number of new business linkages between suppliers and MNEs. New jobs created as a result.

MATCHING FDI WITH DOMESTIC SKILLS

Responsible institution: Ministry of Economy

Cooperating institutions: Ministry of Education and Science, Invest Macedonia, VET Centre, universities

Time frame: 2013 – onwards

Introduction-description of the project: The Government will seek to attract FDI in activities with a good skills supply and support the cooperation between foreign investors and domestic educational institutions.

Project targets: Use domestic skills supply to attract FDI. Elimination of skills mismatch as an obstacle to FDI. Creation of high value-added jobs.

Expected results: Foreign direct investments. Curricula development. Improved functioning of the labour market.

Activities: Needs assessment. Attraction of FDI in selected sectors. Support to joint curricula development. Monitoring.

Indicators for implementation-realisation: FDI inflows. Number of new curricula developed in cooperation with MNEs. New jobs created as a result.

D.4. Strengthen the linkages with the Diaspora SCIENTIFIC NETWORK

Responsible institution: Ministry of Foreign Affairs

Cooperating institutions: Ministry of Education and Science, universities, United Macedonian Diaspora

Time frame: 2013 - onwards

Introduction-description of the project: The project aims to set up an internet-based platform to link the domestic research community with the scientific Diaspora.

Project targets: Developing linkages between Macedonian researchers in the home country and abroad.

Expected results: Information dissemination. Facilitation of research cooperation.

Activities: Setting up scientific network. Launch conference. Functioning of the network.

Indicators for implementation-realisation: Internet-based platform developed. Number of registered platform members.

DIASPORA SHORT TERM STAYS IN THE HOME COUNTRY

Responsible institution: Ministry of Foreign Affairs

Cooperating institutions: Ministry of Education and Science, universities

Time frame: 2014 - onwards

Introduction-description of the project: The project aims to encourage and co-finance short term stays of members of the Macedonian research Diaspora in the home country.

Project targets: Development of linkages between Macedonian researchers in the country and abroad.

Expected results: Transfer of knowledge. Creation of preconditions for future collaboration.

Activities: Assessment of needs and opportunities. Action plan. Publishing calls (for co-financing short stays). Evaluation of proposals. Short term stays. Monitoring.

Indicators for implementation-realisation: Number of short term stays. Number of joint projects.

JOINT PROJECTS

Responsible institution: Ministry of Foreign Affairs

Cooperating institutions: Ministry of Education and Science, universities

Time frame: 2014 - onwards

Introduction-description of the project: The project aims to support research collaboration between Macedonian researchers in the home country and abroad.

Project targets: Development of joint projects between Macedonian researchers in the country and abroad. Transfer of knowledge.

Expected results: Joint projects.

Activities: Developing the legal framework. Publishing calls. Evaluation of project proposals. Contracting. Monitoring and evaluation.

Indicators for implementation-realisation: Number of joint projects. Number of publications and patents. Additional financing attracted by joint projects.

PROGRAM FOR RETURN – PREPARATION OF A STRATEGY FOR BRAIN DRAIN

Responsible institutions: Ministry of Education and Science

Time frame: 2012 – 2015

Introduction-description of the project: Preparation of a Strategy aimed at proposing measures and activities for attracting the Macedonian minds from the Diaspora.

Activities: Analysis of the current situation. Proposal-measures and activities for Brain Gain and Brain Circulation. Implementation of the Strategy.

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