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Report No: 80582-MK

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF EUR 17.7 MILLION
(US$24 MILLION EQUIVALENT)

TO THE

FORMER YUGOSLAV REPUBLIC OF MACEDONIA

FOR A

# SKILLS DEVELOPMENT AND INNOVATION SUPPORT PROJECT

December 19, 2013

Human Development Sector Unit
South East Europe Country Unit
Europe and Central Asia Region

## CURRENCY EQUIVALENTS

Exchange Rate Effective November 30, 2013

Currency Unit = Euro
1 Euro = US$1.36

## FISCAL YEAR

January 1 – December 31

## ABBREVIATIONS

| | |
|---|---|
| CPS | Country Partnership Strategy |
| DA | Designated Account |
| ECA | Europe and Central Asia |
| EU | European Union |
| EMF | Environment Management Framework |
| EMIS | Education Management Information System |
| ENQA | European Association for Quality Assurance in Higher Education |
| EQAR | European Quality Assurance Register for Higher Education |
| FDI | Foreign Direct Investment |
| FITD | Fund for Innovation and Technological Development |
| FYR | Former Yugoslav Republic |
| GDP | Gross Domestic Product |
| GOM | Government of the FYR Macedonia |
| HE | Higher Education |
| HEAEB | Higher Education Accreditation and Evaluation Board |
| HEI | Higher Education Institutions |
| IBRD | International Bank for Reconstruction and Development |
| IFR | Interim Un-audited Financial Report |
| IPR | Intellectual Property Regime |
| M&E | Monitoring and Evaluation |
| MKD | Macedonian Denar |
| MOLSP | Ministry of Labor and Social Protection |
| MOE | Ministry of Economy |
| MOES | Ministry of Education |
| MOF | Ministry of Finance |
| NIS | National Innovation System |
| NTTO | National Technology Transfer Office |
| PDO | Project Development Objectives |
| PAD | Project Appraisal Document |
| PCT | Patent Cooperation Treaty |
| PMU | Project Management Unit |
| POM | Project Operational Manual |
| PSC | Project Steering Committee |
| R&D | Research and Development |
| RTI | Research Training Institution |
| SABER | System Approach for Better Education Results |
| SDIS | Skills Development and Innovation Support Project |
| TA | Technical Assistance |
| TVET | Technical and Vocational Education and Training |
| VET | Vocational Education and Training |
| WB | World Bank |
| WG | Working Group |

| | |
|---|---|
| Regional Vice President: | Laura Tuck |
| Country Director: | Ellen A. Goldstein |
| Country Manager: | Tatiana A. Proskuryakova |
| Acting Sector Director: | Alberto Rodriguez |
| Acting Sector Manager: | Andrea Guedes |
| Task Team Leader: | Bojana Naceva |

**FYR MACEDONIA**
**Skills Development and Innovation Support Project**

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*Macedonia, former Yugoslav Republic of*

*Skills Development & Innovation Support (P128378)*

**PROJECT APPRAISAL DOCUMENT**

*EUROPE AND CENTRAL ASIA*

*ECSH2*

Report No.: PAD656

| **Basic Information** | | | |
|---|---|---|---|
| Project ID<br>P128378 | EA Category<br>B - Partial Assessment | | Team Leader<br>Bojana Naceva |
| Lending Instrument<br>Investment Project Financing | Fragile and/or Capacity Constraints [ ]<br>Financial Intermediaries [ ]<br>Series of Projects [ ] | | |
| Project Implementation Start Date<br>29-Jan-2014 | Project Implementation End Date<br>31-Jan-2019 | | |
| Expected Effectiveness Date<br>03-Feb-2014 | Expected Closing Date<br>31-May-2019 | | |
| Joint IFC<br>No | | | |
| Sector Manager<br>Andrea C. Guedes | Sector Director<br>Alberto Rodriguez | Country Director<br>Ellen A. Goldstein | Regional Vice President<br>Laura Tuck |

| | | | |
|---|---|---|---|
| Borrower: Ministry of Finance | | | |
| Responsible Agency: Ministry of Education and Science | | | |
| Contact: Biljana Trajkovska | | Title: Advisor | |
| Telephone No.: 38923140106 | | Email: biljana.trajkovska@mon.gov.mk | |

| **Project Financing Data(in USD Million)** | | | | | |
|---|---|---|---|---|---|
| [ X ] Loan | [ ] Grant | [ ] Guarantee | | | |
| [ ] Credit | [ ] IDA Grant | [ ] Other | | | |
| Total Project Cost: | 24.00 | | Total Bank Financing: | 24.00 | |
| Financing Gap: | 0.00 | | | | |

| Financing Source | Amount |
|---|---|
| Borrower | 0.00 |
| International Bank for Reconstruction and Development | 24.00 |
| Total | 24.00 |

**Expected Disbursements (in USD Million)**

| Fiscal Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 0000 | 0000 | 0000 |
|---|---|---|---|---|---|---|---|---|---|
| Annual | 1.50 | 2.50 | 5.50 | 8.50 | 5.50 | 0.50 | 0.00 | 0.00 | 0.00 |
| Cumulative | 1.50 | 4.00 | 9.50 | 18.00 | 23.50 | 24.00 | 0.00 | 0.00 | 0.00 |

**Proposed Development Objective(s)**

The Project Development Objective (PDO) is to improve transparency of resource allocation and promote accountability in higher education, enhance the relevance of secondary technical vocational education, and support innovation capacity in Macedonia.

**Components**

| Component Name | Cost (USD Millions) |
|---|---|
| Improving Transparency of Higher Education | 4.00 |
| Modernization of Secondary Technical Vocational Education and Training | 4.50 |
| Improving the innovative capacity of enterprises and collaboration with research organizations | 12.96 |
| Project Management and Monitoring and Evaluation | 2.50 |

## Institutional Data

**Sector Board**

Education

**Sectors / Climate Change**

Sector (Maximum 5 and total % must equal 100)

| Major Sector | Sector | % | Adaptation Co-benefits % | Mitigation Co-benefits % |
|---|---|---|---|---|
| Public Administration, Law, and Justice | Public administration-Education | 20 | | |
| Education | Tertiary education | 40 | | |
| Education | Secondary education | 40 | | |
| Total | | 100 | | |

☑ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

| Themes | | |
|---|---|---|
| Theme (Maximum 5 and total % must equal 100) | | |
| Major theme | Theme | % |
| Human development | Education for the knowledge economy | 80 |
| Public sector governance | Other public sector governance | 20 |
| Total | | 100 |

## Compliance

**Policy**

| | | |
|---|---|---|
| Does the project depart from the CAS in content or in other significant respects? | Yes [ ] | No [ X ] |
| Does the project require any waivers of Bank policies? | Yes [ ] | No [ X ] |
| Have these been approved by Bank management? | Yes [ ] | No [ ] |
| Is approval for any policy waiver sought from the Board? | Yes [ ] | No [ X ] |
| Does the project meet the Regional criteria for readiness for implementation? | Yes [ X ] | No [ ] |

| Safeguard Policies Triggered by the Project | Yes | No |
|---|---|---|
| Environmental Assessment OP/BP 4.01 | **X** | |
| Natural Habitats OP/BP 4.04 | | **X** |
| Forests OP/BP 4.36 | | **X** |
| Pest Management OP 4.09 | | **X** |
| Physical Cultural Resources OP/BP 4.11 | | **X** |
| Indigenous Peoples OP/BP 4.10 | | **X** |
| Involuntary Resettlement OP/BP 4.12 | | **X** |
| Safety of Dams OP/BP 4.37 | | **X** |
| Projects on International Waterways OP/BP 7.50 | | **X** |
| Projects in Disputed Areas OP/BP 7.60 | | **X** |

**Legal Covenants**

| Name | Recurrent | Due Date | Frequency |
|---|---|---|---|
| Maintenance of Adequate Implementation Arrangements | **X** | | CONTINUOUS |

**Description of Covenant**

The Borrower shall: (i) maintain the PMU, the Steering Committee and the Working Group; and (ii) establish and maintain the Investment Review Committee and the Grant Approval Committee; all with staff, resources and terms of reference satisfactory to the Bank.

| Name | Recurrent | Due Date | Frequency |
|---|---|---|---|
| FITD Implementation Arrangement | X | | CONTINUOUS |

**Description of Covenant**

The Borrower, through MOES, shall cause FITD to implement Part 3.2 of the Project, pursuant to an agreement (the FITD Implementation Agreement) to be entered into between MOES and FITD under terms and conditions acceptable to the Bank.

| Name | Recurrent | Due Date | Frequency |
|---|---|---|---|
| Environmental Management Framework | X | | CONTINUOUS |

**Description of Covenant**

The Borrower shall take all necessary measures to implement the Project in accordance with the EMF.

| Name | Recurrent | Due Date | Frequency |
|---|---|---|---|
| Dated Covenant | | 02-Jun-2014 | |

**Description of Covenant**

The Borrower, through MOES, shall not later than 30 days after the Effective date, acquire and install an accounting software for the Project in a manner acceptable to the Bank.

**Conditions**

| Name | Type |
|---|---|
| Adoption of Project Operational Manual | Effectiveness |

**Description of Condition**

The Borrower, through the MOES, has adopted the Project Operational Manual in a manner satisfactory to the Bank.

| Name | Type |
|---|---|
| Establishment of Project Management Unit | Effectiveness |

**Description of Condition**

The Borrower has established the PMU in a manner satisfactory to the Bank, including the hiring of: (i) a full time qualified and experienced financial officer; and (ii) a full time, qualified and experienced procurement specialist.

| Name | Type |
|---|---|
| Condition for Disbursement of Sub-component 2.2 | Disbursement |

**Description of Condition**

No withdrawals shall be made under Sub-component 2.2, until the Borrower has adopted the School Grants Operational Manual in a manner satisfactory to the World Bank.

| Name | Type |
|---|---|
| Condition for Disbursement of Sub-component 3.2 | Disbursement |

**Description of Condition**

No withdrawals shall be made under Sub-component 3.2, until the Borrower has established the FITD, with structure, staff, terms of reference and financial management capacity acceptable to the World Bank.

| Name | Type |
|---|---|
| Condition for Disbursement of Sub-component 3.2 | Disbursement |

**Description of Condition**

No withdrawals shall be made under Sub-component 3.2 until: (i) Innovation Grants Operational Manual has been adopted in a manner satisfactory to the World Bank; and (ii) the FITD Implementation Agreement has been executed in a manner satisfactory to the World Bank.

## Team Composition

**Bank Staff**

| Name | Title | Specialization | Unit |
|---|---|---|---|
| Andrea C. Guedes | Senior Operations Officer | Senior Operations Officer | ECSH2 |
| Jose C. Janeiro | Senior Finance Officer | Senior Finance Officer | CTRLA |
| Antonia G. Viyachka | Procurement Specialist | Procurement Specialist | ECSO2 |
| Jasminka Sopova | Program Assistant | Program Assistant | ECCMK |
| Gulana Enar Hajiyeva | Senior Environmental Specialist | Senior Environmental Specialist | ECSEN |
| Fabiola Altimari Montiel | Senior Counsel | Senior Counsel | LEGLE |
| Roberta Malee Bassett | Senior Education Specialist | Senior Education Specialist | ECSH2 |
| Anneliese Viorela Voinea | Financial Management Analyst | Financial Management Analyst | ECSO3 |
| Bojana Naceva | Senior Education Specialist | Task Team Leader | ECSH2 |
| Indhira Vanessa Santos | Senior Economist | Economist | ECSH4 |
| Gordana Popovikj Friedman | Private Sector Development Specialist | Private Sector Development Specialist | ECSF3 |
| Feyi Boroffice | Private Sector Development Specialist | Co –TTL for Innovation Component | ECSF2 |
| John Gabriel Goddard | Senior Economist | Senior Economist | ECSF2 |
| Zinaida Korableva | Program Assistant | Program Assistant | ECSHD |
| Daniel Kutner | Junior Professional Associate | Junior Professional Associate | ECSH2 |

**Non Bank Staff**

| Name | Title | Office Phone | City |
|---|---|---|---|
| | | | |

**Locations**

| Country | First Administrative Division | Location | Planned | Actual | Comments |
|---|---|---|---|---|---|
| | | | | | |

# I. STRATEGIC CONTEXT

## A. Country Context

1. The Former Yugoslav Republic (FYR) Macedonia is a small, landlocked, middle income country in the Balkan Peninsula. FYR Macedonia has an open economy and has been very successful in maintaining macroeconomic stability, even throughout the recent economic crisis. Average real GDP growth for the period 2004-2008 reached five percent. The country suffered a mild recession in 2009 (of -0.9 percent) but rebounded quickly in 2010 and 2011, when real GDP growth averaged 2.9 percent. The Euro zone turmoil of 2011 and 2012 took its toll on the economy, as industrial production, exports and foreign direct investment dropped, resulting in negative real GDP growth of 0.4 percent for 2012. The Government has followed prudent policies to stabilize the macroeconomic environment, resulting in adequate balances and comparably moderate debt levels. The Government has also continued its efforts to further structural reforms, which have helped the country in improving significantly its *Doing Business* indicators and have contributed to the country's continued success in attracting Foreign Direct Investment (FDI).

2. The challenge facing FYR Macedonia is to transition to a higher growth trajectory by developing a more competitive and export-oriented enterprise sector. In a small open economy where domestic demand is dampened by long-term unemployment and relatively low wages, firms must look to export markets for growth. This is likely to be a challenging transition, as entry will significantly intensify competition for resources and markets. For large-scale FDI to serve as a catalyst for sustained, export-oriented growth at higher rates, domestic firms will need to make much more substantial investments in skills and innovation, both areas identified as critical constraints to competitiveness in FYR Macedonia.[1]

3. FYR Macedonia's solid growth and fiscal performance over the past decade has resulted in a decrease in unemployment, although its overall level remains high.[2] In addition to high unemployment, labor force participation remains well below EU levels, especially among women (around 50 percent). Among those who work, wages and productivity remain low. While unemployment has fallen from around 36 percent in the mid-2000s to today's levels, part of them were low productivity jobs: 27.1 percent of net jobs created since 2007 have been in agriculture, 13 percent in retail trade and 19.7 percent in the public sector.[3]

4. Improving the country's labor market performance and economic competitiveness will require a more skilled and better educated labor force, as well as increased technology absorption, diffusion of knowledge and innovation. While access to education has improved, there is a challenging disconnect between the products of the education system and the private sector needs, as companies complain about the quality and availability of skills despite high unemployment. At the same time, the regulatory, institutional and financial environment can be strengthened to further promote innovation at the firm level and improve commercial significance of its academic science and technology assets.

[1] World Bank, *FYR Macedonia Modular Competitiveness Assessment*, 2011.
[2] The latest rate in Q2 2013 is 28.8 %
[3] World Bank, *FYR Macedonia Employment and Job Creation - Labor Market Assessment 2007-2011*, 2013.

5. The Government of the FYR Macedonia is committed to investing in quality education, innovation and information technology, identified as top strategic priority areas in its Work Program for the period 2011-2015 as well as in the South Eastern Europe 2020 Strategy. To accomplish these objectives, the Government has sought support from the World Bank to advance its reforms to achieve better quality higher and vocational education and innovation systems.

## B. Sectoral and Institutional Context

6. The system for developing skills and innovation activities in FYR Macedonia spans from early childhood through adult education and into research systems. Skills development initiatives fall under the auspices of the Ministry of Education and Science, which also has the main role in science and research and development (R&D), at both the operational level and with regards to funding.

### Higher Education

7. The higher education sector in FYR Macedonia consists of five public and nine private universities and five non-university private institutions, enrolling about 58,000 students, 85 percent of whom attending public universities. Despite recent interventions to increase enrollment at the tertiary level, gross enrollment rate remains at 39 percent, far behind enrollment rates in new EU member states.[4] Further, increase in enrolment has not been matched by an increase in resources and, consequently, the quality of higher education, including its responsiveness to labor market demands, remains a challenge.

8. While critical data on student learning and graduate employment outcomes do not exist, a 2010 World Bank employer survey of the demand for skills showed that employers continue to find it difficult to find workers with the skills required, particularly workers who possess the higher order skills needed in the newly created jobs in modern and dynamic firms.

9. The lack of internal and external quality assurance mechanisms constrains the enhancement of quality and relevance of higher education. Procedures for quality assurance are, to a large extent, insufficient and need to be better aligned with recent European developments. The newly established Board for Higher Education Accreditation and Evaluation has focused only on the accreditation of institutions and study programs thus far. The next step must include an external evaluation of higher education institutions, and the linking of evaluation outcomes with institutional accreditation. Ultimately, this project aims to support the implementation of quality assurance mechanisms that are modern, fair, and participatory.

10. The higher education system also faces severe funding constraints, exacerbated by government interventions to increase tertiary enrollment, which have been neither matched by an adequate increase of resources nor relieved through the promotion of efficiencies in the system.[5] The current funding mechanism is input-oriented and annual; it lacks links to performance and has very limited incentives for universities to pursue new initiatives. Thus, public universities lack the necessary infrastructure and personnel to produce educational outcomes comparable to

[4] Gross Tertiary Enrollment Ratios: Slovenia 87%, Romania 59%, Bulgaria 57%, Slovakia 55% Croatia 54%.
[5] In 2010, 1.36 % of the GDP was allocated for higher education and 1.22 % in 2011.

European countries.[6] Ultimately, finance reforms will need to emphasize both cost-per-student/study place block grants as well as the introduction of performance-based elements to strengthen high performers, provide transparent and equitable mechanisms to determine funding levels, and encourage institutions to focus on areas of strategic importance.

11. Finally, the higher education sector in FYR Macedonia has not developed a centralized mechanism for supporting innovative implementation of research output or technology transfer to and/or from external agencies such as foreign researcher and enterprises. Such a mechanism is imperative for linking the higher education sector to the innovation elements of the FYR Macedonia economy and to promote implementation of innovative engagements between research and firms.

**Vocational Education and Training**

12. Vocational Education and Training (VET) in FYR Macedonia is largely focused on formal secondary school vocational education and training under the auspices of the Ministry of Education and Science (MOES).

13. The Secondary VET system offers four-year vocational education in 14 occupations with 50 educational profiles, as well as visual art, music and sports education, and three-year programs with 36 educational profiles. Over half of secondary education students aged 15-19 attend VET schools. Secondary VET provision has seen profound changes between 1999 and 2006, but there are still significant weaknesses in planning, policy development, and quality management at all levels.

14. A 2010 evaluation carried out to inform the development of a new strategy found that existing secondary TVET system was not producing graduates with professional competencies needed in the labor market.[7] Similarly, a 2010 World Bank employer survey of the demand for skills showed that broad vocational training and many specific higher-level cognitive and behavioral skills sought by employers, such as problem solving, initiative, and ability to organize one's work independently, are not yet being provided by the VET sector.

15. The TVET system has remained predominantly supply-driven, rather than market-oriented. It is aimed at filling existing programs and using existing teachers and facilities, rather than adapting to changes in the market and in the demographic situation. It is characterized by early diversification at the age of 14, excessive specialization, obsolete program content, and lack of collaboration among schools and employers.

16. Finally, the lack of investment in secondary TVET in the last several years has left schools with obsolete and worn-out facilities and equipment. Teachers and instructors lack opportunities for in-service training and are consequently unaware of new good practices and more effective teaching methods.

17. The secondary TVET system in FYR Macedonia faces challenges in terms of its relevance, management, quality, and internal efficiency. These issues are well understood by the

[6] Ss. Cyril and Methodius University in Skopje, *EUA Follow Up Evaluation Report, 2011*. The World Bank, *Higher Education Funding in Macedonia*, 2011.
[7] Ministry of Education and Science and European Training Foundation, *Collaborative evaluation of the impact of the reformed four-year secondary vocational education*, 2010.

Government and have been built into the formulation of the new *Strategy for Vocation Education and Training.*[8] The proposed project interventions in the secondary TVET set the basis for transformation of the system from the narrow occupational to a more general and broader technical education and will enforce the focus on competencies and skills relevant for job market.

**Innovation System**

18. FYR Macedonia's National Innovation System (NIS)[9], dominated by the public sector and detached from industry, needs significant strengthening in order to be able to support the country's long term vision to become a knowledge based economy. In general, the innovative capacity of Macedonian firms is low both in terms of human capital and financial resources for R&D and innovation. Low levels of public and business spending in research and innovation have been exacerbated by the current difficulties and expensive access to finance for firms, declining liquidity and profitability in the private sector, the situation in the Eurozone and the uncertainties in the markets more broadly.

19. According to the *Innovation Union Scoreboard-2013*, FYR Macedonia is classified as "modest innovator," revealing a below average performance on most indicators but also exhibiting certain strengths, such as the contribution of medium and high-tech products to the trade balance and innovation performance that is at a rate above that of the EU27, at 2.6 percent.

20. There are a few examples of excellence in applied R&D, university spin-offs and centers of excellence, but many R&D institutions lack modern infrastructure and are not attuned to the needs of the economy. Their R&D outputs are low in quantity and lacking in quality, and there is no culture of protection and commercialization of research outputs.

21. The Government of FYR Macedonia has taken the first steps towards strengthening the legal framework of innovation by adopting the *Innovation Strategy* in October 2012 and the *Law on Innovation Activity* in May 2013.The Law on Innovation designated the Fund for Innovation and Technological Development (FITD) as the entity to finance the Government's interventions in the area of innovation. The FITD will introduce financial instruments to support new start-ups and spin-offs, commercialization of technology and technology transfer activities thus connecting research and the market, while at the same time creating a source of R&D funding and jumpstarting FYR Macedonia's National Innovation System.

22. In the current post-crisis environment, the Government plays a critical role in stimulating economic recovery via policies that target R&D and innovation. The World Bank is providing technical assistance to the Government of Macedonia and the FITD will help fill the gap that exists between R&D capabilities in the country and industry needs by developing mechanisms to stimulate enterprise based technology thus converting technological 'potential' into economic development.

[8] Ministry of Education and Science and European Training Foundation, *Strategy for Vocational Education and Training: Better Skills for a Better Tomorrow*, 2013.

[9] The National Innovation System (NIS) consists of the policies, laws, regulations, procedures and institutions that affect how knowledge is created, acquired, adopted, disseminated and applied in the economy.

### C. Higher Level Objectives to which the Project Contributes

23. The proposed Project would support the Government of FYR Macedonia's (GOM) initiatives geared to:

- increase graduates' competitiveness on a regional and international level;
- increase labor market relevance of graduates' skills;
- make innovation a source of productivity improvement, competitiveness, increased exportability of goods, and sustained economic growth; and
- increase universities and private enterprises engagement in, and their benefit from, R&D efforts and technology adoption opportunities.

24. The proposed operation would support the objective of the *Country Partnership Strategy* (CPS) for FY11 – FY14, to provide selective and targeted financing and knowledge advisory services in support of faster, more inclusive and greener economic growth. The proposed operation contributes to the first CPS outcome of ensuring faster growth by stepping-up investments in education and skills.

25. The Project would support interventions which foster education and skills relevant to the job market, and enhance the innovation capacity and activity of firms in FYR Macedonia. It will also address key missing elements of the Macedonian innovation system and ailing aspects of the research sector that are likely to be vital for improving the competitiveness of the enterprise sector and FYR Macedonia's longer term economic growth prospects. It will also help improve absorption of EU funds earmarked for innovation activities.

## II. PROJECT DEVELOPMENT OBJECTIVE

### A. PDO

26. The Project Development Objective (PDO) is to improve transparency of resource allocation and promote accountability in higher education, enhance the relevance of secondary technical vocational education, and support innovation capacity in FYR Macedonia.

### Project Beneficiaries

27. The Project's direct beneficiaries include around 24,000 students and 1,500 teaching and management staff from technical vocational education and training institutions who would receive a new curriculum and practical training facilities, as well as training on management, planning, and process improvement capacity.

28. Students and staff of universities, research institutions and enterprises will benefit from: (i) the implementation of quality assurance mechanisms and financing reform in higher education (HE); (ii) grants promoting R&D and innovation; and (iii) technology commercialization, global know-how absorption, and industry- university collaboration fostered by the National Technology Transfer Office (NTTO).

**PDO Level Results Indicators**

29. PDO Level Results Indicators are:

- 80% of public universities receiving financing based on new, transparent funding.
- 80% of public universities accredited, utilizing new quality assurance and accreditation measures developed in accordance with Bologna-defined EU norms and practices.
- 30 % increase in number of secondary TVET students benefiting from practical training in small and medium-size enterprises (SME) and large sized firms.
- Share of private funding mobilized as a percentage of FITD investments in innovation activities.
- Percentage of beneficiaries that sign collaborative agreements between firms and academia.

## III. PROJECT DESCRIPTION

### A. Project Components

30. The Project will be comprised of four components, as described below.

**Component 1: Improving Transparency of Higher Education (US$ 4 million, approximately 16.65% of total financing)**

31. This component will have three main sets of activities, all targeted toward improving both the transparency and efficiency of the quality assurance and finance mechanisms in the higher education sector: (i) institutional strengthening and stronger quality assurance in higher education; (ii) reforming the higher education financing model; and (iii) establishing a centralized office to foster mission-oriented research and university-industry collaboration.

32. **Sub-component 1.1: Quality Assurance in Higher Education.** This sub-component would finance activities targeted toward improving the quality assurance mechanisms in higher education, including: (i) providing training for improving the administrative capacity of the Higher Education Accreditation and Evaluation Board (HEAEB) and other key players in charge of managing quality assurance activities; (ii) funding of external evaluation by foreign experts of FYR Macedonia's higher education sector, and up; and (iii) upgrading of the education management and information system, including the development and implementation of the central data base.

33. **Sub-component 1.2: Higher Education Financing Reforms.** This sub-component would support the design and implementation of a performance-based funding model to promote transparency and efficiency in the resource allocation mechanisms. It would include the following technical assistance activities: (i) assessment of funding model options to select the most appropriate model for the Macedonian context; (ii) design of the funding model, formula and implementation plan; (iii) identification of internal performance indicators and results framework for monitoring and evaluation; and (iv) roll-out of the new finding model. This sub-component would also finance communication campaigns, outreach and dissemination events to inform different groups of stakeholders about these reforms and generate support for them.

34. **Sub-component 1.3: Development of a National Technology Transfer Office (NTTO).** This subcomponent would support the development of a central office to be the system-wide interface between the research community and the industry, and a national focal point for international cooperation. It would play a key role in the conversion of the results of research into competitive products and processes, and steer research towards industry needs. The proposed NTTO, while performing typical tasks such as industry outreach, would additionally be a center for advising the industry in FYR Macedonia on Intellectual Property (IP) in-licensing and technology importation and integrating the innovation activities of Macedonia with EU programs The subcomponent would provide technical assistance for establishment and operationalization of the NTTO and would also finance the salaries of experts and the purchase of patent and market intelligence databases.

**Component 2: Modernization of Secondary Technical Vocational Education and Training (US$ 4.5 million, approximately 18.7% of total financing)**

35. This component would finance activities targeted toward building the foundation of a modern and efficient secondary TVET system that is characterized by delayed tracking of students into vocational pathway, increased relevance of the standards and curriculum for the labor market and improved mechanisms for school-industry collaboration. It consists of two sub-components.

36. **Sub-component 2.1: Quality and labor market relevance of TVET provision.** This sub-component would contribute to the modernization of the secondary TVET system and its relevance for the labor market needs, and improving the capacity of TVET secondary schools to deliver quality TVET. Specifically, this sub-component would finance: (i) technical assistance to support the development of an overarching model for the transformation of the secondary TVET provision; (ii) development of occupational standards, competency-based curriculum and programs; (ii) efficiency assessment of the secondary TVET school network and development of a proposal for restructuring the network; (iii) development of a training program for teachers and other staff, including identification of required skills, development of training materials and rollout of the program; and (iv) carrying out of a need analysis and acquisition of equipment for school-based practical training.

37. **Sub-component 2.2: Grants for school-industry collaboration.** This subcomponent would finance technical assistance activities aimed at: (i) designing and implementing a grant program to support TVET activities; and (ii) provision of School Grants to selected TVET schools to finance activities to improve the labor market relevance of the vocational education and training including involving industries into the practical training delivery.

**Component 3: Improving the Innovative Capacity of Enterprises and Collaboration with Research Organizations (US$ 12.94 million, approximately 54% of total financing)**

38. This component is focused on supporting the efforts of the FYR Macedonia Fund for Innovation and Technological Development (FITD) to build the institutional capacity to stimulate innovative activities, and piloting financial instruments to support innovation and technological development in the enterprise sector. It is organized around two sub-components.

39. **Sub-component 3.1: FITD capacity building.** This sub-component would finance activities required to build up institutional competence of the FITD, in particular, providing support for: (i) planning and designing the programs, strategy, operations and procedures; (ii) training of FITD staff; (iii) selection of the Investment Committee and peer reviewers; (iv) mentoring and training for FITD beneficiary enterprises; and (v) marketing and communications strategy.

40. **Sub-component 3.2: Pilot of Financial Instruments to be delivered by FITD.** Once established, the FITD would provide specific funding instruments for each stage of companies' life cycle to foster innovation. These instruments will include: (i) an accelerator; (ii) proof of concept innovation mini grants, including but not limited to IP protection, and business plan preparation for initial capital mobilization; (iii) commercialization matching grants and loans; and (iv) sector specific grants in technology development and technology absorption projects for new or improved technologies, products and processes. It is anticipated that the pilot instruments will be introduced in a phased approach starting with the accelerator and proof of concept grants.

**Component 4: Project Management and Monitoring and Evaluation (US$2.5 million equivalent, approximately 10.4% of total financing)**

41. **Subcomponent 4.1: Project Management.** This sub-component would support the operation of a Project Management Unit (PMU) reporting to a Project Director and responsible for all the day-to-day project implementation activities, as well as procurement, disbursement and accounting functions. World Bank financing would be provided for consultants employed as part of the PMU, as well as for assistance and training to all project staff, project audits, office equipment and incremental operating costs.

42. **Subcomponent 4.2: Monitoring and Evaluation.** M&E are crucial elements of program design as they provide important feedback mechanisms for policy, effectiveness, and credibility of the programs. The Project would support the design and implementation of (i) tools to monitor the results framework for the Project; (ii) M&E studies/surveys to establish a baseline for project results indicators as well as their measures during project implementation and upon project; (iii) impact evaluation for selected innovation programs; and (iv) skills observatory. World Bank financing would be provided for technical assistance; services and training of the Ministry of Education and Science staff engaged in monitoring; and the design, implementation, and analysis of evaluation surveys.

## B. Project Financing

### Lending Instrument, Project Cost and Financing

43. The proposed Project would use an Investment Project Financing implemented over a five year period.

**Table 1: Project Components and Costs**

| Project Components | Estimated Cost (US$ equivalent) | IBRD Financing (US$ equivalent) | % Allocation of Loan Funds |
|---|---|---|---|
| 1. Improving Transparency of Higher Education | 4,000,000 | 4,000,000 | 16.65 |
| 2. Modernization of Secondary Technical Vocational Education and Training | 4,500,000 | 4,500,000 | 18.70 |
| 3. Improving the Innovative Capacity of Enterprises and Collaboration with Research Organizations | 12,940,000 | 12,940,000 | 54.00 |
| 4. Project Management and Monitoring and Evaluation | 2,500,000 | 2,500,000 | 10.40 |
| Total Baseline Costs | 23,940,000 | 23,940,000 | 99.75 |
| Total Project Costs | 23,940,000 | 23,940,000 | 99.75 |
| Front-end Fee | 60,000 | 60,000 | 0.25 |
| Total Financing Required | 24,000,000 | 24,000,000 | 100.00 |

## C. Lessons Learned and Reflected in Project Design

44. This operation builds on the lessons learned from the numerous ongoing engagements of similar scope in the ECA Region and the Western Balkans. The team has incorporated in the design of this project the following lessons: (i) giving the private sector a central role in the development of curricula, the definition of professional standards and governance is critical to improving the responsiveness of TVET systems to labor market needs; (ii) focusing on system-wide reforms—dealing with strategic policy issues—can provide longer-term benefits than a narrow focus on, for example, financing new construction; (iii) beyond addressing issues related to the demand and supply of skills, interventions are also needed to improve the flow and quality of information used by educational institutions, government, students, parents, firms, and these interventions can be very cost-effective; and (iv) financing reforms for the tertiary education system can provide opportunities for both efficiency gains and modernization of higher education institutions.

45. In the area of innovation support, the proposed Project builds on the experiences and lessons from recent and current World Bank investment and technical assistance operations developing the innovation framework across the region, including Bulgaria, Croatia, Russia and Serbia. Some key lessons from these operations emphasize the importance of: (i) a strong dedicated champion to move the reforms along at the institutional level; (ii) private sector participation, vital in the restructuring process, for the sector's ability to inject into the process efficiency, management capability, good governance, and cost-effective design and delivery; (iii) striking a balance between the broader needs of technology development, on the one hand, and the absorptive capacity of the targeted local firms and research institutions, on the other hand, with careful consideration of the ability of a single World Bank project to handle a number of activities; and (iv) M&E, for which reason the M&E framework envisioned under the Project is designed to minimize the risk of capture and failure in the design process by systematically evaluating the impact and effectiveness of the publicly funded instruments to stimulate innovation.

46. The proposed Project also builds upon lessons learned from ongoing partnerships between the Government of FYR Macedonia and the World Bank, including experience with previous operations and several relevant technical assistance activities in higher education, labor market and employment.

## IV. IMPLEMENTATION

### A. Institutional and Implementation Arrangements

47. The Implementing Agency for the Project would be the Ministry of Education and Science. Project implementation would basically rely on the existing structures of the MOES, the newly established Fund for Innovation and Technology Development (FITD) and the Working Group. The MOES staff would be supported by the PMU. Implementation arrangements place an emphasis on continually strengthening the MOES's capacity, and capacity building of FITD to promote long-term sustainability of the system. The Project implementation structure would consist of:

- **Project Steering Committee (PSC).** The overall authorizing environment would come from the PSC. The main role of the PSC would be to ensure inter-institutional coordination and provide overall project oversight and strategic guidance, as well as to assist in resolving implementation obstacles. This PSC will be chaired by the Deputy Prime Minister for Economic Affairs and will include representatives of the MOES, Ministry of Finance (MOF), Ministry of Economy (MOE), Ministry of Labor and Social Protection (MOLSP), Inter-University Conference members, and representatives from the business sector. The latter will be appointed by the National Council for Entrepreneurship and Competitiveness.
- **Working Group (WG).** The WG was established at the beginning of project preparation and comprises technical experts from the MOES, MLSP, MOF, MOE, the Cabinet of the Deputy Prime Minister for Economic Affairs, and the VET Center. The WG has been meeting regularly with the World Bank team to discuss ongoing policy development and preparation issues. The WG would be maintained throughout project implementation to provide technical expertise and support.
- **Project Management Unit (PMU)**. Day-to-day activities under the Project would be managed by a PMU headed by a Project Director. PMU staff would include one procurement specialist, one financial officer, area coordinators for each of the four components and one environmental expert to provide assistance on environmental safeguards issues. The PMU would report to the Minister of Education and Science and to the PSC; it would be responsible for overall project coordination, monitoring activities, safeguard and fiduciary functions, and reporting.
- **Investment Review Committee (IRC)** consisting of competitively selected international and local experts from the academia and private sector would be responsible for evaluating and selecting sub-project proposals to receive grants/loans, based on criteria described in the Grants Operational Manual, and acceptable to the Bank.
- **Grant Approval Committee (GAC)** consisting representatives of MOES, the local self-government and the Chamber of Commerce would be responsible for evaluating and selecting proposals from secondary VET schools for joint projects with enterprises. The

GAC will be guided by criteria described in the Grants Operational Manual and acceptable to the Bank.

48. While the Working Group has been established at a very early stage of project preparation, it is expected that the remaining bodies of the implementation structure would be established within the first few months of project approval. The establishment of the PCU is an effectiveness condition. Steps have also been taken for establishment of the PSC and the IRC, expected after project effectiveness. The GAC will be established in the first year of project implementation, after the design of the grant program is developed.

## B. Results Monitoring and Evaluation

49. The Project would include a robust M&E framework to enable decision makers to track performance, adjust implementation as needed, and demonstrate the impact of policy interventions financed by the Project. M&E under the Project would be integrated into regular monitoring functions of MOES and FITD.

50. The PDO level and intermediate results indicators would be monitored using the following sources and methodologies: (i) regular data collection process; (ii) baseline and follow-up surveys; and (iii) evaluation reports. In addition, ex-post evaluations will be carefully designed and carried out for selected programs that require longer time-span to assess their impact. Likewise, a performance evaluation to assess and review implementation of the competitively awarded grants in secondary education would be carried out before project completion.

51. The Project Director would be responsible for regularly updating monitoring indicators.

## C. Sustainability

52. Sustainability of project activities beyond its implementation period is expected to be high, as the Project is embedded in the broader framework of FYR Macedonia's EU pre-accession agenda. The Project can help the GOM meet the EU's *Acquis* standards in the area of science and research, as well as to align its economic directions with the priorities expressed in the *Europe 2020 Strategy*. Furthermore, project activities support implementation of the priorities set forth in the recently adopted VET strategy. The Government has clearly articulated its commitment to modernize the VET system through both the VET strategy and the Action Plan for implementation and financing of the reform. The proposed interventions support various aspects of the Strategy in a way which aims to produce a more holistic and sustainable approach. The interventions would also provide structure and incentives for greater participation of the private sector during project implementation and after its closure via their permanent involvement in the quality management process, development of occupational standards and via improvement of the overall relevance of the system to employers' demands.

53. The higher education finance reforms supported under the Project would increase the efficiency in the allocation of higher education financing, following international good practices. The newly adopted *Rulebook on Accreditation and Quality Assurance in Higher Education* establishes the legal foundation for linking evaluation outcomes with institutional accreditation ensuring a level playing field for public and private providers. The Project would also strengthen the capacity of the HE Institutions and the Board for Accreditation and Evaluation to increase

quality and credibility of evaluations. The NTTO is expected to become sustainable primarily on account of revenues it generates from the industry for services rendered. Royalties from commercialization activities, though not expected to be significant will however add to the revenue stream.

54. The FITD would finance mostly in the form of grants rather than loans. The fundamental objective of the FITD is to address a market failure and not be a profit-making enterprise. However, certain investments (accelerator, etc.) would take an equity position which would bring revenues to FITD. In line with Europe 2020 strategies, support to increasing the innovation capacity of firms under the Innovation Component would stimulate both private and public investment in innovation and commercialization of research results. Sustainability of this component is ensured by the strong institutional support and sound regulatory framework for the establishment of the FITD, the introduction of internationally accepted financial instruments for supporting innovation projects at firm and industry levels, and by the strong support of the international donor community.

## V. KEY RISKS AND MITIGATION MEASURES

### A. Risk Ratings Summary Table

| **Risk Category** | **Rating** |
|---|---|
| **Stakeholder Risk** | Moderate |
| **Implementing Agency Risk** | High |
| - Capacity | High |
| - Governance | High |
| **Project Risk** | |
| - Design | Moderate |
| - Social and Environmental | Low |
| - Program and Donor | Low |
| - Delivery Monitoring and Sustainability | Moderate |
| **Overall Implementation Risk** | High |

### B. Overall Risk Rating Explanation

55. The Project's overall preparation risk is assessed as moderate, and the implementation risk as high. Key risks include the external economic and political environment on the one hand and internal risks with regard to the implementation and absorptive capacities, stakeholder buy-in and governance, on the other. Steps for mitigating the risks have been taken from the onset of project preparation, including careful monitoring of the external and political environment, and planning the activities taking into consideration upcoming elections so as to minimize implementation delays. Considering the risks associated with implementation capacity and

coordination, a very positive development in project preparation was the establishment of an Inter-Ministerial Council on Innovation and a balanced Working Group for the Project, with members from each Ministry and relevant agencies, to oversee the project design and implementation.

56. In terms of absorption capacity, the Project has been developed to minimize the risk that the research and business communities alike would have challenges absorbing a new influx of funding for sub-projects. It will take time for the Innovation Fund to deploy the resources under this operation, given the weak absorption capacity of the private sector. Mitigation measures have been embedded in project design to overcome the absorption challenges, namely: (i) implementation would take place in two phases, giving time for capacity to be built up before scaling-up of the investment resources; (ii) the operation would support a balanced mix of grant programs based on competitive selection mechanisms and larger investments in innovation infrastructure; and (iii) simple instruments that have been tried-and-tested in many different environments would be adopted to ensure faster selection and disbursement of funds.

57. Implementation risks are associated with the negligible initial capacity of the nascent FITD as its capacity development is a major component of the project. Similarly, low capacity among enterprises to prepare project proposals and provide their share of financing is a potential risk during implementation. The FITD will provide mentoring to entrepreneurs and the Investment Committee would be afforded the flexibility to adjust the matching components of the financial instruments based on the project pipeline.

58. Finally, risks associated with governance, particularly of the FITD, would be mitigated by tight monitoring and supervision. During project preparation, the World Bank reviewed the proposed governance structure for the establishment of the Fund. Most importantly, the governance structure includes an Investment Committee of international experts who will be responsible for making investment decisions. The World Bank has also advised the Government in establishing rulebooks for the various FITD instruments that will create clear rules and guidelines minimizing any abuse of authority and limiting arbitrary decisions while maintaining adequate flexibility in disbursement of funds to applicants. However, the FITD will be appraised to the World Bank's satisfaction before disbursements can be made to piloting financial instruments by FITD.

## APPRAISAL SUMMARY

### A. Economic and Financial Analysis

59. **Economic impact**. Although a full cost-benefit analysis is hard to do given the nature of the Project, it is expected to have a net positive impact in the economy of FYR Macedonia. Project components aimed at improving the quality of TVET and higher education are expected to yield economic benefits by increasing returns to education as "new quality" graduates become more demanded in the labor market, as well as by attracting more people into the system and creating more incentives to complete degrees. Returns to higher education in FYR Macedonia are positive and high by international standards: on average, employees, with a higher education diploma have hourly wages 62 percent higher than earnings associated with a secondary education degree. Returns are particularly high for women (at around 75 percent). Returns to innovation are also expected to be high, even without accounting for externalities. The literature

suggests, more generally, that R&D investments can have an average of 25 percent private return and a 65 percent social return. On the side of costs, beyond the costs of the loan and its servicing, most of institutional reforms are expected to have relatively low economic costs.

60. **Financial and fiscal impact**. The Project poses no risk to the macroeconomic or fiscal stability of FYR Macedonia. In terms of financial sustainability, the full fiscal impact of the project is expected to be low, since it would focus on the improvement of the quality and relevance of higher education and VET and improvement of the innovative capacity of enterprises and research entities. It is expected that these activities can be both sustained and even expanded over the long run, provided that the Government maintains its investment in higher and vocational education in line with its fiscal framework and continues to support its recent policy reforms. All of the initiatives outlined in the proposed project support FYR Macedonia's accession into the EU and there is likely additional funding to come to the country from EU sources as soon as FYR Macedonia begins negotiations for EU accession.

## C. Technical

61. The technical design of the Project is based on the comprehensive reform priorities of the Government, detailed in recently adopted national policies on Innovation (2012), Vocational Education and Training (2013), and Science and Research (2012) as well as from the World Bank's technical experience and international best practices in promoting knowledge-based growth in the ECA region and beyond.

62. The analytical underpinnings of the Project are manifold. In recent years the World Bank has provided technical assistance to FYR Macedonia on VET Strategy, technical assistance for quality assurance in higher education in Europe as well as best practice models for higher education financing. Modular Competitiveness Assessment (2012) has pinpointed growth constraints in four main export sectors and offered recommendations on how to support the competitiveness of the private sector. This body of analytical work, together with several regional studies on skills, jobs, and R&D provided the technical basis for the design of this operation.

63. The recent World Bank report "From Jobless Growth to Growing Jobs: Fostering Employment Creation in Eastern Europe and Central Asia" reveals that the demand for skills has been swiftly moving away from routine, cognitive activities towards "new economy" skills that include non-routine cognitive and non-cognitive skills. The report suggests that policies must help build skills for the workplace by focusing on development of a strong foundation of generic skills, an expansion of the tertiary education system that ensures quality and relevance, and the promotion of a VET system that is responsive to the labor market so as to enable the lifelong upgrading of skills. Reforming the TVET from the narrow occupational to a more general and broader technical education, and improving transparency and efficiency of the quality assurance mechanisms in higher education are expected to increase labor market relevance of graduates' skills as well as to attract more people to the system.

64. The review of 24 OECD countries' higher education systems[10] highlights trends in the evolution of mechanisms to fund educational institutions. One of the more significant trends is a marked shift to allocation mechanisms that are more performance-based. Performance contracts, performance set-asides, competitive funds and payments for results are all performance-based methods of funding. Promoting finance reforms for the higher education system provides opportunities for both efficiencies and modernization of opportunity for the higher education institutions in FYR Macedonia.

65. Finally, the design of the innovation financing instruments takes into account FYR Macedonia's nascent entrepreneurial activity, its limited venture capital and angel-investor climate, its geographic proximity to the EU and its markets, and its track record of high human capital and research capacity. In addition, the proposed instruments have been tried-and-tested in many different environments, including neighboring countries such as Serbia, Croatia and Bulgaria.

## D. Financial Management

66. The overall financial management risk for the Project is substantial before mitigation measures. As the Fund for Innovation and Technological Development (FITD) is not yet established, and thus its capacity to implement Sub-component 3.2 has not been yet assessed and appraised, the residual risk remains substantial. In order for financial management arrangements to be acceptable, effectiveness conditions include: (i) a qualified and experienced Financial Officer would be employed by the MOES; and (ii) Project Operational Manual covering financial management would be prepared and adopted. Additionally, acceptable accounting software would be acquired and installed by MOES for project records no later than 30 days from effectiveness; and appropriate financial management arrangements will be instituted in FITD prior to starting disbursement on Sub-component 3.2.

67. Financial management activities, which include accounting, financial reporting, application and monitoring of internal controls, flow of funds, budgeting and coordination with the external auditors, will be carried out by a PMU within MOES, which would also be responsible for the overall implementation of the Project.

68. The Project would finance the establishment and capacity building for the FITD which will act as a stand-alone agency to provide specific funding instruments to help foster innovation development in FYR Macedonia. The FITD will be established as a first budget holder. While the Law on Innovation Activity has been adopted and published in the Official Gazette No. 79/13, FITD is yet to be established. Preliminary budgetary allocations have been committed to the Fund for the next three years. The State Budget for 2014 is being prepared and will be finalized and publicly-available by the end of the year. The approved Budget for 2014 will confirm the FITD status and funding for the next year. In order to contribute towards building capacity within the Fund in medium and long term, it was discussed during appraisal that the new entity would manage independently the flow of funds under the innovation Sub-component 3.2. A separate Designated Account in Euro would be opened in the National Bank of FYR Macedonia, and would be mirrored by a local currency account as part of the Single Treasury

[10]Santiago, Tremblay, Basru and Arnal (2008) Tertiary Education for the Knowledge Society, Volume 1. OECD. http://oecd-conference-teks.iscte.pt/downloads/OECD_vol1.pdf

Account to be used for payments to beneficiaries. The Fund is to maintain adequate analytical project records and report on a quarterly basis to MOES on the use of funds under the Sub-component 3.2. Disbursement under Sub-component 3.2 would be conditioned by proper establishment and appraisal of the Fund, and preparation of an Operational Manual for the innovation financial instruments satisfactory to the World Bank. Similarly, disbursement under Sub-component 2.2 would be also conditioned by preparation of a manual acceptable to the Bank describing the arrangements for the grants for school-industry collaboration.

69. Project management-oriented Interim un-audited Financial Reports (IFRs) would be used for project monitoring and supervision. The PMU would produce a full set of IFRs for all project components for each calendar quarter throughout the life of the project, including the funds disbursed by the FITD for which the FITD would provide necessary information on a regular basis. Such reports will be due 45 days after each quarter end.

70. Annual project financial statements would be audited in accordance with terms of reference acceptable to the World Bank by an independent audit firm acceptable to the World Bank, and the audit report would be submitted to the Bank not later than six months after the end of the period audited. The scope of audit would be extended from overall project financial statements, to audit of randomly selected financial statements of the grants beneficiaries for both vocational training, respectively innovation components and in relation to the use of Loan funds. The audit terms of reference would contain specific provisions regarding the scope of the audit and would be finalized when the procurement of the audit would be initiated.

## E. Procurement

71. A PMU within MOES would be established by the time of Project effectiveness. The PMU would be responsible for the overall project coordination, monitoring activities, the fiduciary functions (procurement, disbursement and accounting) and reporting. The PMU team would be funded from the Loan proceeds, as the Ministry's current staffing capacity is under constraint and it would be fairly difficult to find appropriate resources to implement the Project. A POM would be finalized by the time of Project effectiveness and should include, among other things, a detailed description of the procurement arrangements under the Project and detailed Terms of Reference (TOR) for the PMU staff, including a TOR for the full time Procurement Specialist.

72. Procurement of contracts required for the activities to be financed out of the proceeds of the Loan shall be procured in accordance with the requirements set forth or referred to in World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by the World Bank Borrowers" dated January 2011 and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by the World Bank Borrowers" also dated January 2011; and the provisions stipulated in the Legal Agreement. A Procurement Plan for the first 18 months of the Project was prepared during project appraisal and its final version agreed at project negotiations.

73. The Control and Project risks are identified as substantial, as the Implementing Agency has not yet identified a project implementation team. Residual Project Risk after mitigation measures are taken is identified as moderate. In order to mitigate the risks for procurement management, the following steps have been agreed: (i) a full time, qualified and experienced

Procurement Specialist would be hired before project effectiveness; and (ii) the POM shall include detailed description of overall procurement arrangements.

### F. Social (including Safeguards)

74. The Project would not trigger the Social Safeguards. Nonetheless, its results framework would capture data disaggregated by gender, whenever possible/available. Institutions that receive project grants would be asked to provide team data disaggregated by gender. Every innovation grant proposal would be reviewed to avoid any negative social implication and/or potential gender bias.

### G. Environment (including Safeguards)

75. This Project is classified as Category B. The Project Environmental Management Framework (EMF) was prepared and publicly disclosed prior to project appraisal.

76. The main environmental concern deals with the grant programs under Component 3 of the Project, which would be provided to enterprises for R&D as well technology development projects to support the development of new or significantly improved technologies, products and processes. Given that the types of projects to be financed are not known at this stage, the MOES has prepared an EMF document that outlines the procedures to be used. The EMF procedures shall screen sub-projects/grants to ensure: (i) compliance with the World Bank Group exclusion list; (ii) that no sub-projects with significant impacts of a Category A type are supported; and (iii) that sub-projects/grants would not necessitate involuntary land acquisition. The EMF also allows provisions for all activities corresponding to sub-projects defined as Category B to have an Environmental Management Plan that would identify potential environmental impacts and provide adequate mitigation measures in place prior to approval.

## Annex 1: Results Framework and Monitoring

## FYR MACEDONIA: Skills Development and Innovation Support Project

| **Project Development Objective:** The PDO is to improve transparency of resource allocation and promote accountability in higher education, enhance the relevance of secondary technical vocational education, and support innovation capacity in FYR Macedonia. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PDO Level Results Indicators** | Core | Base-line | Cumulative Target Values | | | | | Frequency | Data Source/ Methodology | Responsibility for Data Collection | Description |
| | | | YR 1 | YR 2 | YR3 | YR 4 | YR 5 | | | | |
| 1. % of public universities receiving financing based on new, transparent funding model. | | 0 | 0 | 0 | 0 | 40% | 80 % | Annual | Project progress reports | MOES's Department for Higher Education | There are 5 public universities in FYR Macedonia Formula and data underpinning funding model made publicly available and accessible |
| 2. % of public universities accredited, utilizing new quality assurance and accreditation measures developed in accordance with Bologna-defined EU norms and practices. | ☐ | 0<br><br>No existing mechanism | 0 | 0 | 20% institutions accredited | 60% institutions accredited | 80 % institutions accredited | Semi-annual monitoring report | Project progress reports | MOES's Department for Higher Education | There are 5 public universities in FYR Macedonia |
| 3. % increase in number of secondary TVET students benefiting from practical training in SME and large sized firms. | ☐ | To be provided by TVET schools in YR 1 | | | 10% | 20% | 30% | Annual | School administrative data | TVET schools and VET Center | The reference population is all 2nd, 3rd and 4th grade secondary TVET students Increase is measured as a % from baseline |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4. Share of private funding mobilized as a percentage of FITD investments in innovation activities. | | 0 | 0 | 5% | 15% | 20% | 25% | Semi-annual monitoring report | Progress reports of FITD | FITD | financing mobilized by participants in FITD grants programs as a % of total FITD investment |
| 5. % of beneficiaries that sign collaborative agreements between firms and academia. | ☐ | 0 | 0 | 5% | 10% | 15% | 20% | Semi-annual | Project progress reports | FITD | Beneficiaries are participants in all 4 type of grant programs |

**Intermediate Results**

**Component 1 – Higher Education Finance Reforms and Implementation of Quality Assurance Norms**

| Intermediate Results Indicators | Core | Baseline | Cumulative Target Values | | | | | Frequency | Data Source/ Methodology | Responsibility for Data Collection | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | YR 1 | YR 2 | YR3 | YR 4 | YR 5 | | | | |
| 1. Implementation of new higher education funding model. | ☐ | The new funding model is not developed | Funding model, formula and implementation plan developed | Performance indicators and results framework for monitoring and evaluation defined | New funding model approved by the GOM | | | Semi-annual | Consultant's report and Project progress reports | PMU | |
| 2. Number of public universities that have completed an external evaluation utilizing new quality assurance measures developed in accordance with Bologna-defined EU | | 0 | 0 Legal framework adopted institutions evaluated | 2 institutions evaluated | 3 institutions evaluated | 5 institutions evaluated | | Semi-annual | Consultant's report and Project progress reports | PMU and MOES | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| norms and practices. | | | | | | | | | | | |
| 3. Board of Quality Assurance and Accreditation achieves membership in ENQA (the European Association for Quality Assurance in Higher Education) | ☐ | Board of Quality Assurance and Accreditation NOT a member of ENQA | Requirements for ENQA membership identified and strategy for meeting those requirements developed | Strategy for meeting ENQA membership requirements approved by MOES | Strategy for achieving membership implemented | Strategy for achieving membership implemented | Board of Quality Assurance and Accreditation achieves full member status in ENQA | Semi-annual | Board of Quality Assurance and Accreditation report | PMU | |
| 4. National Technology Transfer Office (NTTO) established and operational | | Not in existence | NTTO blueprint prepared after a landscape analysis | NTTO established and begins operations | NTTO operational | NTTO operational | NTTO operational | Annual | NTTO internal reports | NTTO | |
| 5. IP related cases handled for industry as measured by number of patent landscape analysis (PA), patents filed (P) and technology in-licensing (importation of technology) | | | 0 | 5(pa)<br>2 (p) | 10(pa)<br>2(p))<br>10(l) | 20(pa)<br>10(p)<br>15(l) | 30(pa)<br>15(p)<br>25(l) | Annual | NTTO internal reports | NTTO | |
| 6. Domestic inventions by RTIs commercialized as measured by number of patents filed(P), licenses(L), and contract research (C ) | | | 0 | 0(p)<br>0(l)<br>5(c) | 2(p)<br>0( l)<br>10(c) | 3(p)<br>1(l)<br>15(c) | 15(p)<br>2(l)<br>25(c) | Annual | NTTO internal reports | NTTO | |
| **Component 2 – TVET quality and relevance** | | | | | | | | | | | |
| 1. The TVET action plan that promotes general and broader technical education and competence- based learning adopted | | Not in existence | The model is adopted by the Minister of Education and Science | / | / | / | / | Semi-annual | Project progress reports | VET Center and PMU | The action plan will specify: a) main milestones in process of delayed tracking of the students b) consolidation of the existing occupations; c) |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | social partnership between educators, employers and relevant government agencies. |
| 2. % of TVET occupational standards developed by professional fields | | 0 | | 50% | 100% | 100% | 100% | Semi-annual | Project progress reports | VET Center and PMU | There are 14 professional fields In definition of standards social partners will have a key role in articulating the 'competencies' expected in any professional field. |
| 3. % of updated TVET curricula in line with occupational standards | | 0 | / | / | 30% | 70% | 100% | Semi-annual | Report from expert consultant working with VET Center | VET Center and PMU | Report will check the alignment of each updated curriculum against the competences covered under the new occupational standards |
| 4. % Increase in number of companies providing practical training to secondary TVET students. | | To be determined in YR 1 | | | 10% | 20% | 30% | Semi-annual | School administrative data | VET Center and PMU | Increase is measured as a % from baseline |
| 5. Share of updated TVET secondary school programs targeting key sectors of the local economy. | | No information available; To be undertaken in YR1 | / Review of the schools network | / Proposal for optimization and operational plan approved | 30 % | 50% | 70% | Semi-annual | Project progress reports and report from expert consultant working with TVET | VET Center and PMU | Key sectors of the local economy are those which have high employment level ( top 3-5 employers covering 80% of all employment) and/or high employment growth ( top quintile)and /or high productivity (top quintile in the |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | last 5 years) |
| 6. Manual and training materials for quality delivery of new curricula adopted | | Not in existence | / | / | Manual and training material developed | Manual and training materials piloted | Manual and training materials adopted | Semi-annual | Project progress reports | VET Center and PMU | |

**Component 3 - Improving the innovative capacity of enterprises and collaboration with research organizations**

| Intermediate Results Indicators | ore | Baseline | Cumulative Target Values | | | | | Frequency | Data Source/ Methodology | Responsibility for Data Collection | Description |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | YR 1 | YR 2 | YR3 | YR 4 | YR 5 | | | | |
| 1. Share of resources dedicated to Fund for Innovation and Technology Development (FITD) instruments disbursed | | 0 | 5% | 20% | 50% | 80% | 100% | Semi-annual monitoring report | Progress reports of FITD | FITD | |
| 2. Number of companies 'accelerated' via the FITD Accelerator program | ☐ | 0 | 0 | 5 | 10 | 15 | / | Semi-annual monitoring report | Project Progress reports | FITD | Accelerator which supports firm creation will have a 3 year life |
| 3. # of beneficiary firms to introduce new/improved products | | 0 | 0 | 5 | 15 | 25 | 30 | Semi-annual monitoring report | Progress reports of FITD | FITD | Beneficiaries of accelerators, mini and matching grants. |
| 4. # of beneficiary firms to introduce new processes | | 0 | 0 | 0 | 1 | 2 | 4 | Semi-annual monitoring report | Progress reports of FITD | FITD | Beneficiaries of tech extension programs that achieve standardization/certification |

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| 5. % of beneficiaries receiving training and mentoring | | 0 | 20% | 40% | 50% | 60% | 70% | Semi-annual monitoring report | Progress reports of FITD | FITD | Firms (mostly in accelerator) would receive guidance etc in advance of funding |
| **Component 4 - Project Management and monitoring and evaluation** | | | | | | | | | | | |
| Intermediate Results Indicators | ore | Baseline | Cumulative Target Values | | | | | Frequency | Data Source/ Methodology | Responsibility for Data Collection | Description |
| | | | YR1 | YR2 | YR3 | YR4 | YR5 | | | | |
| 1. Evaluations for Innovation grants designed, conducted and reported | | Not in existence | Design completed; Base line data collected | | | Follow-up data collected and analyzed | Evaluation reports completed and results disseminated | Annual | Reports of Evaluation design and those of results | PMU and FITD | |
| 2.Skills Observatory established, providing information about TVET and HE performance to the public | | Skills Observatory is not in existence | Skills observatory established and fully staffed | EMIS complemented with a module for performance of the formal TVET and HE systems | Mechanisms for data collection agreed and tracer studies conducted | Website platform available for public to access info on performance of TVET and HE | The info on platform being updated at least twice per year | Annual | Project progress reports | PMU and MOES | |

## Annex 2: Detailed Project Description

## FYR MACEDONIA: Skills Development and Innovation Support Project

1. The Project Development Objective (PDO) is to improve transparency of resource allocation and promote accountability in higher education, enhance the relevance of secondary technical vocational education, and support innovation capacity in FYR Macedonia.

### Component 1: Improving Transparency of Higher Education (US$ 4 million, approximately 16.65 % of total financing)

2. This component would have three main sets of activities, all targeted toward improving both the transparency and efficiency of the quality assurance and financing mechanisms in higher education: (i) institutional strengthening and improvement of quality measurements—data collection and data-driven policy development—in higher education; (ii) reforming the higher education finance model; and (iii) establishing a centralized office for fostering mission-oriented research and university-industry collaboration.

### Subcomponent 1.1: Quality Assurance in Higher Education

3. Building upon the knowledge generated and lessons learned through earlier Bank-funded technical assistance, this activity would finance improvement and consolidation of the quality assurance processes at the national and institutional levels. The aim is to put in place appropriate and transparent accreditation procedures that would create a level playing field for public and private institutions. This would include capacity building to the Board for Higher Education Accreditation and Evaluation (HEAEB) on the processes, criteria and procedures for external quality assurance in FYR Macedonia and establishing the links between external evaluation and accreditation. The World Bank worked with the HEAEB in 2012 to provide capacity building on trends in Quality Assurance in European Higher Education Area and ENQA membership requirements. This activity would help to further advance HEAEB efforts on meeting the standards for the ENQA membership.

4. This subcomponent would finance activities targeted toward improving the quality and relevance of higher education as articulated through the *Law on Higher Education (2008)*, which stipulates several specific issues related to quality assurance, including the following.

(a) First, it would support improving the administrative capacity of the HEAEB and other key players in managing quality assurance activities. This sub-component would support the HEAEB's meeting the requirements and paying the requisite membership fees to be recognized as a fully compliant member of the EQAR and ENQA[11]. In so doing, the

[11] Requirements include: organizations should undertake external quality assurance activities (at the institutional or program level) on a regular basis; be formally recognized by competent public authorities in the European Higher Education Area as agencies with responsibilities for external quality assurance and should have an established legal basis and comply with any requirements of the legislative jurisdictions within which they operate; should have adequate and proportional resources, both human and financial, to enable them to organize and run their external quality assurance process(es) in an effective and efficient manner, with appropriate provision for the development of their processes, procedures, and staff; should have clear and explicit goals and objectives for their work, contained in a publicly available statement; should be independent to the extent that they both have

HEAEB will be recognized as an internationally qualified accreditation agency, and their accreditation outcomes for FYR Macedonia higher education institutions and academic programs (and their competencies in teaching and research) will be of a globally recognized and assessed quality.

(b) Another significant quality activity funded through this sub-component would be the external evaluation by foreign experts of FYR Macedonia's higher education sector, including all universities and all other higher education institutions through an institutional evaluation of the universities, with two main goals: (i) a neutral, factual assessment of the current situation on the ground in the higher education sector; and (ii) the provision of an analytical assessment of areas for improvements and investments, recommendations for priority interventions, and roadmaps for implementing needed reforms.

(c) Drafting the manuals to underpin the external evaluation would also be a significant activity supported under this subcomponent. These manuals would provide the legal framework for the engagements of both the HEAEB and the external experts to conduct the evaluations.

(d) Finally, this sub-component would support upgrading of the education management and information system (EMIS), including the development and implementation of the central data base essential for monitoring the operation and outputs of the tertiary education and for administering the common admission system. At the institutional level, the Project would finance technical assistance and capacity building for the introduction of modern management practices, including the design and implementation of an integrated EMIS for student affairs, academic programs, human resources management, budgeting and financial management, and infrastructure management.

**Subcomponent 1.2: Higher Education Financing Reforms**

5. This sub-component would support following up on the outputs of the recent Bank-led higher education technical assistance program (2011-2012) aimed at supporting Government efforts to design and implement a performance-based funding model. In addition to outlining the value and key dimensions of this new approach, the technical assistance program provided practical tools for designing the new funding formula and defining an elaborated set of performance indicators. In particular, the technical assistance program supported a pilot initiative which examined the technical elements of implementing a cost-per student funding model at the flagship Macedonian university (UKIM - University Ss. Cyril and Methodius).

6. The lessons learned through the piloting of the cost-per-student include: universities in FYR Macedonia are highly supportive of this initiative to develop a more transparent funding model; the data needed to underpin an initial effort to establish block grants based on a cost-per-student or cost-per study place model is not yet available and needs to be collected and managed

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autonomous responsibility for their operations and that the conclusions and recommendations made in their reports cannot be overturned or influenced by third parties; should have in place procedures for their own accountability; and should have an appeals procedure available. EQAR and ENQA are two such notable agencies, based in Brussels and well-regarded in the field of European quality assurance for higher education.

centrally; and to support broad transparency in this process, all data related to establishing the block grants based on cost-per-student or cost-per-study place must be publicly accessible.

7. Once the block grant element of the funding model is designed and implemented, the more innovative elements of finance reform would be considered—in particular, performance-based funding, which creates well-defined institution-government partnerships. Earlier technical assistance related to higher education finance reform introduced this concept to the Government and the higher education sector, all of which were receptive to this transparent, modern, and adaptable funding model as a potentially transformative reform for FYR Macedonia.

8. Project funds would finance the following technical assistance activities:

(a) assessment of funding model options—including use of stable, basic funding (often through cost-per-student formulas), performance management contracting, and funding agreements, based on institutional strategic planning—to determine the most applicable model for the Macedonian context;

(b) preparation of the funding model and formula, as well as the related implementation plan;

(c) identification of internal performance indicators and results framework for M&E of the system; and

(d) implementation of the new finance model.

9. This subcomponent would also finance communications campaigns, outreach and dissemination events.

**Subcomponent 1.3: Development of a National Technology Transfer Office (NTTO)**

10. This subcomponent would support the development of a central office to serve as a nation-wide interface between the scientific community and private sector, and the National Focal Point for international cooperation. Its primary mission would be to convert the results of research into competitive products and processes, and foster industry oriented research. It will provide services that promote: interdisciplinary exchange of information, industry oriented research and development, national and international technology transfer and commercialization, appreciation of importance of innovation and IP among stakeholders, and innovation commercialization—all with the goal of fostering local economic development and helping move the ecosystem towards the innovation frontier. Staff in such an office would ideally include experts with deep knowledge of IP law, technology, and industry. The NTTO would not be merely a clearinghouse for innovation arising from research, but a vital organ in the system that connects research to industry and the results of commercialization to society at large. The NTTO, acting as National Focal Point for international cooperation, would provide personalized support, guidance, practical information and assistance on all aspects of participation in EU and other international programs. This includes advice on technical and administrative questions concerning the calls for proposals, partner search, national priorities, and matching national co-financing possibilities, where applicable.

11. Unlike technology transfer offices in the developed world where one office serves a single university or research training institution (RTI), the National TTO in FYR Macedonia should not only serve all RTIs and universities, but also provide assistance to firms and

entrepreneurs for in-licensing (importation) of technology. The technology transfer office model used in developed nations should not be adopted as it is not appropriate in the context of FYR Macedonia. The proposed NTTO would also be responsible for advising the industry on topics related to identifying promising areas of research (patent landscape analysis), technology scouting, and IP in-licensing (especially from international sources). The NTTO would maintain a database of activities thus helping conduct superior M&E of innovation commercialization activities in the country.

12. Project funds would finance the following activities:

(a) development of a strategy for the NTTO after an initial scan of the needs and capacities of RTIs and industry as well as an implementation roadmap and policies governing the NTTO;

(b) establishment of a system for the storage, handling and management of data on locally and globally available technologies, local research capacity and outputs, and local enterprise challenges and goals;

(c) purchasing of patent and market databases for the proposed center;

(d) scouting, hiring, and salaries of experts and staff to run the center;

(e) consulting fees for patent attorneys on case by case basis, as needed;

(f) preparing information exchange activities with relevant national and international institutions/organizations, and costs associated with marketing the IP; and

(g) training of stakeholders on topics related to innovation and IP commercialization.

13. This subcomponent would also finance communications campaigns, outreach and dissemination events, and highlight salient success stories, upon completion of the launch of the technology transfer center. Such outreach activities are vital to create a culture of innovation commercialization.

**Component 2: Modernization of Secondary Technical Vocational Education and Training (US$ 4.5 million, approximately 18.7% of total financing)**

14. This component would finance activities targeted toward building the foundation of a modern and efficient secondary TVET system that is characterized by delayed tracking of students into vocational pathway, increased relevance of the standards and curriculum for the labor market and improved mechanisms for school-industry collaboration. These changes are expected to lead to the transformation of the secondary TVET from the narrow occupational to a more general and broader technical education and to result in greater labor market relevance and transferability of skills, and increased flexibility in secondary TVET provision. It consists of two sub-components.

**Sub-component 2.1: Quality and labor market relevance of TVET provision.**

15. This sub-component would contribute to modernization of the secondary TVET system and its relevance for the labor market needs and improving the capacity of TVET secondary schools to deliver quality TVET by means of new standards and curriculum modules, new training facilities, and better trained teachers and administrators.

16. *Concept for Modernization of the Secondary TVET.* This activity would finance technical assistance supporting the development of a new concept for secondary TVET. The main principle of the new concept is a shift from the narrow occupational training to a more general and broader technical education and promotion of flexible paths between vocational training, general education and higher education. The tracking of the students will be delayed until after the second year of secondary education to ensure that students attain general and academic basic skills before being tracked into vocational education. These general and academic skills will allow them to be more adaptive to changing economic environment, and increase internal and external mobility of the graduates in the labor market. In addition the concept would provide a proposal for consolidation of the existing occupations based on the national priorities for economic development and labor market needs. It would also include a proposal for enhanced social partnership between educators, employers and relevant government agencies. The concept would guide institutions in designing all other strategic documents for secondary TVET.

17. *Efficiency Assessment of the School Network.* The activity would contribute to aligning of the network to the new model for modernization of the secondary TVET and the needs of the economy, by meeting the needs for cost effectiveness, the needs of learners, the local businesses and the local government. This activity would finance an assessment of the network of VET schools to examine the capacity of each secondary VET school to provide programs with regard to availability of qualified teaching staff, equipment, possibility for practical training of students in the firms as well as regarding the economic, demographic and cultural environment in which each school operates. The assessment would be accompanied by an appropriate cost-benefit analysis and would provide a proposal for restructuring the network i.e. re-branding the schools and an operational plan for gradual implementation of the proposal.

18. *Development of Standards for Vocational Qualification.* The "National Methodology for Development of Occupational Standards" (2009) would be revised to ensure that qualification standards not only define the content of each vocational qualification (knowledge, skills and competences), but are also elaborated in partnership with representatives of the industries, professional associations, and government agencies. This activity would also provide technical assistance and guidance to the developers of occupational standards.

19. *Development of Competency-Based Curriculum.* This activity would finance technical assistance in developing the core curriculum and the program to guide the educational institutions in designing new secondary TVET programs. The new programs are expected to have a modular structure and to define the competences students need to acquire in respective vocational areas, as well as related expected learning outcomes, and suggest appropriate assessment techniques. The focus thus should be shifted from educational inputs – what is being taught and how – to educational outcomes – what a student will know and will be able to do.

20. *Training of School Managers and Teachers.* The activity would fund identification of the skills required from teachers and other staff to ensure high quality delivery of the revised curricula, and the development of manuals and other training materials which would provide the basis for staff training. The activity would then support the rollout of the training program in pilot occupations to enable quality implementation of the reform.

21. *Upgrade of Equipment for School-Based Practical Training.* This activity is designed to mitigate the shortage of key training equipment in the secondary TVET schools. The Project

would finance: (a) need analyses and proposal for procurement of key training equipment per occupation and per TVET school; (b) provision of key training equipment needed for the revised courses; and (c) develop school guidelines for managing the equipment.

**Sub-component 2.2: Grants for school-industry collaboration**.

22. This subcomponent is aimed at supporting school-business collaboration and identifying successful models for engaging enterprises in practical vocational training. It would finance technical assistance activities aimed at designing a grant program to support joint projects between TVET schools and enterprises aimed at improving the practical training of students, as well as fund the grants. In addition, the Project would provide technical assistance to schools and MOES in the implementation of competitive grant program. The MOES would receive technical assistance for the development of an Operational Manual for awarding grants on a competitive basis, and schools would receive assistance for preparation of project proposals.

23. All secondary TVET schools (72 in total) that voluntarily prepare grant applications in cooperation with enterprise/s would be eligible to apply for grants of approximately US$ 6,000 to US$ 10,000. The primary responsibility for implementation of the grants would rest with the schools, under the oversight of their school boards, school management and staff. In addition, a Grant Approval Committee would be established under the Project to evaluate grant application based on criteria set out in the Grant Operational Manual.

24. A School Grant Operational Manual (SGOM) would define the following: (i) the selection processes; (ii) eligibility criteria; (iii) eligible and ineligible activities to be financed through grants program; (iii) the allocation formula for grant award limits; and (iv) implementation and reporting arrangements. The completion of the SGOM satisfactory to the Bank would be a condition for disbursing against this activity.

25. The key instrument for implementing this subcomponent would be the Improvement Agreement between the Ministry of Education and Science on the one hand and a TVET School and participating business on the other.

**Component 3: Improving the innovative capacity of enterprises and collaboration with research organizations (US$ 12.94 million, approximately 54 % of total financing)**

26. This component is focused on: (i) supporting the efforts of the FYR Macedonia Fund for Innovation and Technological Development (FITD) to build the institutional capacity to stimulate innovative activities and (ii) piloting financial instruments to support innovation and technological development in the enterprise sector.

**Sub-component 3.1: Capacity Building of the FYR Macedonia Fund for Innovation and Technology Development (FITD)**

27. The Innovation Law designated the FITD as the entity to spearhead the Government's interventions in the area of innovation. The FITD is a new entity that would be responsible for public financial support for innovation. Specifically, the Fund is to pilot: (i) financial instruments to support entrepreneurship, innovation commercialization and in-house business innovation at the pre-commercial and growth stages; and (ii) promote collaborative research and innovation linkages with research organizations and business innovators. This component would finance the activities required to build up the institutional competence of the FITD to undertake the

complex task of running a successful innovation program. In this context, this component would support:

(a) *Planning and designing the programs, strategy, operations and procedures.* This activity would include the design of the organizational structure and operational framework of the Fund, development of governance mechanisms, competencies and skills requirements of staff, and establishing operational rules that ensure transparent functioning, prompt investment decision making and effective delivery mechanisms, the design of performance measuring and control mechanisms for the FITD as a whole in terms of its effectiveness of reaching the intended beneficiaries and for the management of each program of the FITD. It would also design current and future financial instruments; establish policy and regulatory mechanisms; design and implement organizational and operational procedures; assess training needs; design plans for fundraising and liaising with relevant international organizations; and design plans for business development.

(b) *Staffing and training of FITD staff.* While extensive due diligence would be undertaken to select the right caliber of staff to undertake this operation, it is well understood that expertise in this area is lacking in FYR Macedonia. An overarching goal of this project is for FYR Macedonia to develop expertise locally in the area of innovation and therefore the services of an international resident advisor engaged to support the FITD staff would likely be required. The advisor would provide hands-on support to implement, do quality control and perform day-to-day monitoring of the project. The advisor should have significant innovation expertise and would be expected to be heavily involved in the beginning of the process and gradually wind down her/his engagement as she/he transfers her/his knowledge to the FITD staff. Furthermore, staff would receive training from experts and organizations, with the goal of developing expertise and capacity to design and manage current and future financial instruments. Areas of focus for training would include: (i) company formation; (ii) commercialization; (iii) promotion and design of financial instruments; (iv) conducting due diligence in early-stage technology development; (v) technology transfer; and (vi) project management.

(c) *Selection of the Investment Committee and peer reviewers.* It is critical for the selection process of beneficiaries to be transparent with the selection based solely on merit and completed in a short time frame. Therefore the quality and independence of reviewers is of great importance. This activity would support the establishment of an independent due diligence and selection process through (i) an independent Investment Committee – including early stage technology development experts from the private sector industry, financial, entrepreneurial community and applied research sectors- that will be responsible for financing decisions, and (ii) engagement of international experts as peer reviewers for technical due diligence process, as needed.

(d) *Mentoring and training for Fund beneficiary enterprises.* This activity supports the design and implementation of mentoring and training programs on entrepreneurship and commercialization, including but not limited to financial management, fund raising and venture capital, business development, legal and Intellectual Property (IP), and other areas of expertise identified by Fund beneficiaries. It is expected that training would be provided by reputable international experts and organizations based on needs identified by FITD beneficiaries.

(e) *Marketing and Communications strategy.* The component would support the FITD to develop a coherent communications strategy, with the goal of promoting the financial instruments to ensure a solid pipeline of applicants. This activity would also finance a number of events and workshops during the course of the Project, including but not limited to project launch, call for proposals, project closing, workshops to promote awareness about entrepreneurship and innovation, EU innovation policy and programs (such as, for example, FP7, European Mobility Portal), as well as networking events for academia, entrepreneurs, and private investors.

**Sub-component 3.2: Pilot of Financial Instruments to be delivered by FITD**

28. **Once the Innovation Fund is established, it would provide specific funding instruments to help foster innovation development in FYR Macedonia**. The instruments to be supported by the Project are to span the entire spectrum of firm development timeline and are to include: (i) an accelerator; (ii) proof of concept innovation mini grants, including but not limited to IP protection, and business plan preparation for initial capital mobilization; (iii) commercialization matching grants and loans; and (iv) sector specific grants-extension program in technology development and technology absorption projects for new or improved technologies, products and processes.

| **Box 1: Proposed Pilot Financial Instruments** | |
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| **Accelerator**: | |
| *Rationale:* | Macedonian entrepreneurs and innovative start-ups face a number of obstacles that negatively impact their potential for growth and, in many cases, their survival. Among key issues is limited access to external sources of financing for innovative activities (e.g. for prototyping or pilot production), lack of success stories, lack of mentorship and general lack of a culture of innovation. To address this gap it is necessary to stimulate a change in culture and encourage risk taking and innovation. Existing incentive mechanisms such as EU competitions and prizes have helped spur entrepreneurship to some degree, but have failed to create solid institutional and continuing support to such activities. As a result, winners of such competitions do not have the much needed later rounds of financing and support to grow. The accelerator is expected to address this.<br><br>Business incubators/accelerators with early stage investment funds if well designed and implemented could effectively enhance the ability of start-ups to grow and survive. The accelerator would bring the much needed financial support and mentorship/guidance to entrepreneurs. Given the nascent nature of the risk/equity capital industry in the country, an accelerator with attached funds could help catalyze innovation financing and complement existing or planned interventions and should be an early important step towards creation of risk capital market in the country. |
| *Intervention:* | Creation of business accelerators with early stage investment funds could become dynamic tools for fostering new ventures across a variety of sectors but particularly in ICT, by linking talent, technology, capital, and know-how in an effective framework. By playing a critical role in providing services to assist new venture get off the ground including combination of in-house consulting, access to a network of support businesses specializing in marketing, business planning, legal, accounting, mentoring and other services, as well as access to finance, the accelerator will fill the gaps in the entrepreneurial system.<br><br>By identifying promising start-ups and investing in innovative business ideas, and helping start-up firms access seed capital from networks of angels and state schemes, the accelerator will also help catalyze creation of private risk capital in Macedonia.<br><br>The incubators/accelerators could be established based on existing incubators and centers for entrepreneurship. They should be located close to FYR Macedonia's best technical university/engineering school in order to facilitate access to the human capital with ideas that can be transformed into innovative businesses as well as access to in-house technology development and commercialization. |
| *Instrument design:* | Based on international practice, a seed investment of up to US$ 30,000 to a single start up is reasonable with the potential for a second round of financing of up to US$ 100,000. To ensure the greatest impact and least wastage, investment guidelines should encourage co-financing by the private sector and solid industry relevance of the financed project. This would help prevent creation of a culture of "easy grant money'' and "cemetery of prototypes''. The investments should be made with a view that the funded enterprise is able to achieve financing and grow once it has achieved the stated objectives of the financing. Projects will be up to 12 months in duration financed in lieu of equity. The accelerator would act as general partner and FITD the limited partner |

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| **Proof of Concept Mini Grants:** | |
| *Rationale:* | There is a low level of firm level innovation, technology absorption, and entrepreneurship in the country. Risk aversion, lack of funding and scale are cited as key reasons why firms do not innovate, adopt technology, and commercialize the results of their invention by creating new or improved products or processes. The concept of innovation, technology adoption and process improvement as a driver of competitive advantage is still not prevalent in FYR Macedonia. Practitioners point out that many firms while cognizant of benefits of using technology and adapting/customizing it to their needs, either lack the expertise to identify and address specific issues, or lack the finance to integrate such innovation/technology improvement to enhance their businesses. |
| *Intervention:* | The grant would be open to incorporated entrepreneurs, start-ups, spin-offs from universities, micro and SMEs, with majority Macedonian private sector ownership that have an innovative idea (innovation here being defined very broadly as customization or adaptation of global knowledge stock and not necessarily new to the world technology or process) with solid promise of commercialization. The grant is aimed at fostering firm level innovation by providing much needed risk capital. The grant would be open to all legal entities that classify as small business as explained in the instrument design section. Innovation may or may not involve RTIs. Most of this innovation is expected to be essentially technology adoption and adaptation to local context and not new to the world. Innovation funds would strictly be for product or process innovation and not for working capital, purchase of capital equipment, or traditional business expansion. By providing the much needed early stage capital to firms that wish to develop new or improved products or processes, the grant will foster a culture of risk taking and innovation. |
| *Instrument design:* | Applicant firm may not have revenues more than EUR 1,000,000. Up to 85% of the funding (maximum US$ 40,500) would be provided in the form of a grant. A Technical Assistance (TA) component of the grant is expected to be used to hire management consultants who could provide expertise in financial management, fund raising and venture capital, business development, legal and IP, and other areas of expertise. |
| **Commercialization Matching Grants and Loans** | |
| *Rationale:* | The goal of this instrument is to incentivize increase in private sector R&D and collaboration between academia and industry. Currently private investments in R&D are very low and research efforts at RTIs are not aimed at R&D which can be commercialized with little to no industry university collaboration. |
| *Intervention:* | The instrument would be open to firms of all sizes that wish to develop an innovative product or process either on their own or in collaboration with another firm or university. The instrument would provide the much needed impetus to industrially relevant innovation and its commercialization by firms especially SMEs. The project must have clear commercialization objective. The instrument would require that the research output be protected via patenting, if applicable.<br><br>The instrument would foster the concept of innovation and innovation adoption as well as commercialization among industry. It would also help foster collaboration between industries, and between industries and academia, and between domestic SMEs and firms and universities abroad. Collaboration with partners in developed countries would be encouraged. This intervention would help in creating a culture of conducting mission oriented research with clear commercialization objectives, patenting, and boosting exports |

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| | via international IP licensing. It would also help foster industry orientation or RTIs and build R&D capabilities in mission oriented research. It would also catalyze a culture of IP protection and licensing. |
| *Instrument design:* | Up to 70% (maximum US$ 135,000) funding for research projects with specific commercialization goals would be funded in the form of grants or conditional loans (depending on firm revenues) with a matching percentage depending on the size of the firm and the types of activities being funded. Royalties (up to 5%) may be required by FITD on successful projects. |
| **Sector Specific- Technology Extension** | |
| *Rationale:* | Technology extension refers to programs that improve the technological capabilities of existing industries and businesses by bridging the gap between knowledge stock already available globally or nationally and local industries. Such programs thus focus on adoption and adaptation of technology and innovation that is not new to the world but may be new to the country or new to the industry. In essence such programs conduct knowledge and know-how arbitrage. Given that Macedonia is not on the research frontiers, Macedonian firms are likely to benefit greatly from technology extension. Relatively simple measures such as achieving certain benchmarking in order to achieve certification of standard/quality can help export potential of firms.<br><br>Extension programs typically involve the following basic steps undertaken by extension agents at the firm level: a) diagnostic; b) preparation of an improvement plan; and c) assistance in implementing the improvement plan. These steps can also be applied simultaneously to a group of firms in the same industry. Subject areas for the diagnostic and improvement plan can include: strategic management; human resources development; quality, cost, logistics, and environmental management; production systems; continuous improvement, lean manufacturing, six sigma, 5S, etc. Technology extension programs typically do not focus on the creation of new intellectual property and R&D, but rather supporting firms to catch up and move to the technology frontier. |
| *Intervention:* | Macedonian firms especially SMEs are constrained in scouting for technological know-how, and experimenting with new technologies and processes. Extension programs assist with not only identifying the sources of relevant innovation, but through an array of services including training and advisory services and helplines, promote the adoption of know-how in the industry. By helping a group of firms or certain industry achieve certain benchmarks, technology extension programs will deepen the knowledge base of the industry and induce competition thus creating a new equilibrium in the industry which is at a higher innovation and productivity frontier. |
| *Instrument design:* | Support will be in the form of 50/50 matching grant of up to US$ 270,000. Preference will be given to consortium of firms collaborating with each other and with industry associations and chambers of commerce. |

29. The FITD would be making equity investments, grants, and conditional grant. The fund could potentially have returns from the equity investments in the accelerators as the start-ups funded attract private financing or are acquired by larger companies, or through royalty payments from financed patents. Any income earned by the FITD would be ploughed back into the fund (revolving fund).

**Component 4: Project Management and Monitoring and Evaluation** (**US$ 2.5 million, approximately 10.4 % of total financing**).

30. This component would finance activities to: (i) ensure effective administration and implementation of the Project; and (ii) develop and put in place an effective monitoring and evaluation system.

**Subcomponent 4.1: Project Management.**

31. This sub-component would support the operation of a PMU. The PMU is to report to the Project Director and would be responsible for all the day-to-day project implementation activities, as well as procurement, disbursement, and accounting functions. Bank financing would be provided for consultants employed as part of the PMU, as well as for assistance and training to all project staff, project audits, office equipment and incremental operating costs.

**Subcomponent 4.2: Monitoring and Evaluation.**

32. The Project would support the design and implementation of: (a) tools to monitor the results framework for the Project; (b) M&E studies/surveys, to establish baselines for project results indicators as well as their measures upon project completion; (c) ex-post evaluation using survey of selected innovation programs; and (d) skills observatory. World Bank financing would be provided for technical assistance; services and training of the MOES staff engaged in monitoring; and the design, implementation, and analysis of evaluation surveys. This sub-component would also provide support for the development of evidence-based policymaking via the establishment of an Observatory to strengthen labor market and education information systems. This Observatory would make available to the public, policy-makers and stakeholders information on the performance (e.g. students placed in practical training at firms, job placements after graduation) and resources available (e.g. courses, firms providing internship and practical training opportunities, infrastructure, instructors) in VET schools, higher education institutions as well as general labor market information on employment opportunities and wages in different occupations and sectors. This sub-component would finance one tracer study for TVET and one for higher education employment outcomes of graduates, including technical assistance for designing such studies and carrying out the related proposed methodologies. The outcome of this activity would not only be the utilization of collected data but also the capacity building necessary to continue such activities in the future.

## Annex 3: Institutional and Implementation Arrangements

## FYR MACEDONIA: Skills Development and Innovation Support Project

1. **Project Administration Mechanisms**: The Project would be implemented by the MOES. A Project Steering Committee (PSC) chaired by the Deputy Prime Minister for Economic Affairs would provide overall project oversight and strategic guidance, and assistance in resolving obstacles to project implementation. The PSC would meet at least three times a year during the first and second year of project implementation and at least twice a year in the remaining years.

2. In addition to the Deputy Prime Minister for Economic Affairs, members of the PSC would include representatives of the Ministry of Education and Science, Ministry of Finance, Ministry of Economy, Ministry of Labor and Social Policy, Inter-University Conference members and representatives from the business sector. Representatives from the business sector would be appointed by the National Council for Entrepreneurship and Competitiveness. The constitution of the PSC shall be described in the POM.

3. Project implementation would rely on the existing structures of the MOES, the newly established Fund for Innovation and Technology Development (FITD), and the Working Group. A Project Management Unit (PMU) would be formed to support the existing structures for managing the proposed Project. Some units within the MOES and the FITD, with the assistance of the PMU, would be responsible for the technical implementation of project activities, which includes: (i) preparing Terms of Reference (TORs) and technical specifications; (ii) designing training programs; (iii) supervising consultants; (iv) analyzing products delivered by consultants; and (v) participating in procurement evaluation committees and in grants implementation plans evaluation commissions. Professionals of the MOES (civil servants) and the FITD would facilitate the technical inputs for specific project implementation activities and would work directly with the PMU, as shown in the matrix below.

4. The Project Director would report to the Minister of Education and Science. The main role of the Project Director would be to coordinate the implementation of all component areas of the Project. To ensure smooth coordination of project implementation and communication among the major stakeholders, the Project Director would act as main liaison with: (i) the World Bank; (ii) representatives of the MOES; (iii) representatives of the FITD; (iv) representatives of the MOF; (v) the Investment Review Committee; (vi) the Grant Approval Committee and (vii) recipients of grants. In addition to the Project Director, the following professionals would form the PMU, all reporting to the Project Director:

- four Coordinators – one for each component;
- one Procurement specialist;
- one Financial Officer; and
- one Safeguards specialist.

5. Procurement, financial management and disbursement issues would be the responsibility of the MOES with assistance from the PMU. Oversight of project grants sub-components, however, would be the responsibility of the Coordinators for the Secondary TVET and the Innovation components. The main responsibilities of the PMU include: (i) coordination of overall project implementation activities as specified in the POM; (ii) preparation of all the necessary project implementation documents; (iii) working closely with the Working Group, representatives from MOES and FITD on implementation issues; (iv) payment of school grants, oversight and control

of grants disbursements; (v) ensuring effective monitoring and evaluation of project achievements and outcomes, and managing a monitoring and evaluation budget; (vi) coordinating with other relevant agencies and beneficiaries involved in project implementation; and (vii) preparing progress reports in accordance with the provisions of the Loan Agreement. FITD would be responsible for disbursement under Sub-component 3.2, maintaining appropriate project records and reporting on a regularly basis to MOES on the use of funds.

6. The overall fiduciary responsibilities of the proposed Project would rest with the fiduciary staff of the PMU within the MOES, respectively FITD, but grantees would have their own fiduciary responsibilities, as defined in the Grant Operational Manuals. The Coordinators for Innovation and Secondary TVET would provide additional support and supervision for the procurement activities of the grants beneficiaries. The Financial Officer in the PMU would process transfers as advances of funds and account for eligible expenditures, that is, actual costs for Goods, Works and Services, in line with their overall responsibilities for all payments under the Project. The MOES, including PMU, are expected to participate in the technical review and evaluation of grant proposals under the Sub- component 2.2, monitoring of grants implementation, and review of progress reports prepared by beneficiaries. Based on such review and positive findings, the Project Director would approve the transfer of the tranches to the beneficiary, which would then be processed by the PMU. Similarly, FITD will process payments to beneficiaries for the innovation financial instruments envisaged under sub-component 3.2, as per the procedures that will be described in the respective Grant Operational Manual that must be satisfactory to the Bank.

7. Project grant funds would be awarded through competitive processes, either for school-enterprise collaborations (Sub-component 2.2) or innovations (Sub-component 3.2). Sub-component 2.2 grants would be awarded based on assessment of applications by a Grant Approval Committee consisting of representatives of MOES, the local self-government and the Chamber of Commerce, based on criteria described in the Grant Operational Manual, and acceptable to the Bank. The same rule will apply for Sub-component 3, where an Investment Review Committee consisting of competitively selected international, and local experts as peer reviewers —from both the academic and private sector, would evaluate the grants sub-projects proposals based on clear criteria and rules described in the Grant Operational Manual, acceptable to the Bank.

**Table 2: Matrix of Responsibilities for the Technical Implementation of SDIS Project Subcomponents**

| Subcomponents | Units within the Institutions |
|---|---|
| 1.1 Higher Education Finance Reforms | Department of Higher Education- MOES |
| 1.2 Higher Education Quality Assurance and Relevance Activities and Grants for innovative proposals for institutional management capacity building | Department of Higher Education-MOES |
| 1.3 Development of a National Technology Transfer Office | Departments of Science and Higher Education –MOES |
| 2.1 Quality and relevance of TVET provision | VET Center - MOES |
| 2.2 Grants for school-enterprise collaborations | VET Center - MOES |
| 3.1Capacity Building of the FYR Macedonia Fund for Innovation and Technology Development (Fund) | MOES-FITD |
| 3.2 Pilot of Financial Instruments | FITD |
| 4.1 Project Management | Project Management Unit |
| 4.2 Project Monitoring and Evaluation | Project Management Unit |

**Financial Management, Disbursement and Procurement**

*Financial Management*

8. ***Risk analysis:*** The overall financial management (FM) risk for the project is substantial before mitigation measures, and as the Fund for Innovation and Technological Development (FITD) is not yet established, and thus its capacity to implement Sub-component 3.2 has not been yet assessed and appraised, the residual risk remains substantial. In order that the FM and disbursement arrangements of the project are acceptable, several effectiveness and disbursement conditions, and an FM dated-covenant have to be met, as described below. The school-industry and business innovation grants involve risk for flow of funds and internal controls. The risk would be mitigated by the preparation of two Grant Manuals, which would describe all relevant procedures relating to their specific mechanism. The manuals would be a disbursement condition for the respective sub-components. Risk in the area of accounting and financial reporting would be mitigated by the acquisition and installation by MOES of an appropriate accounting system that would allow recording project transactions to an adequate level of details and automatic reporting on the use of Loan proceeds. The PMU needs to be adequately staffed by Loan effectiveness. In order to contribute towards building capacity within the Innovation Fund (FITD) on a longer term, it was agreed that FITD would manage independently the flow of funds under the Sub-component 3.2. A separate Designated Account (DA) in Euros would be opened in the National Bank of FYR Macedonia, and would be mirrored by a local currency account within the Treasury Single Account to be used for payments to beneficiaries. The Fund will maintain adequate analytical project records and report on a quarterly basis to MOES on the use of funds under the innovation Sub-component 3.2. Once established, the capacity of the new FITD would be assessed by the Bank prior to starting disbursement under Sub-component 3.2. The financial management arrangements instituted for the Project will be detailed in the financial section of the POM.

9. ***Staffing***. The current Ministry staffing capacity is under constraint and it would be fairly difficult to find appropriate resources to implement the Project. It was agreed with the Bank that MOES would use external consultants with relevant qualifications and experience. In order to strengthen capacity within MOES, financial staff within its structure would be involved in the procedures pertaining to the Project and would participate in any relevant training organized by the World Bank. Terms of Reference for the financial staff with detailed descriptions of duties will be attached to the POM. The PMU should be staffed with core functions and become operational by the Loan effectiveness.

10. The FITD will be established as a first level budget user, a stand-alone entity to support projects fostering innovation. Given the complexity of the third component of the Project that would pilot various types of financial instruments to support R&D commercialization and business innovation, it is important that the capacity of the new entity is adequate to take over the selection and administration of the grants and other financial instruments, disbursement of funds, accounting and reporting of transactions under the innovation component, and that proper monitoring arrangements are in place. Once established, adequate staffing arrangements should be instituted within FITD in order to ensure up-to-date and reliable project records and a good cooperation with MOES.

11. ***Planning and Budgeting.*** The Ministry budget is formulated and approved as part of the funding coming from the State Budget. Plans and budgets for all sources of financing will be entered in the accounting software, once acquired. It is important that there be sufficient capacity for planning and budgeting, in order to manage project funds in an optimal manner from aspects of funds allocation, liquidity and overall performance. Variances of actual versus budgeted figures should be monitored on regular basis, appropriately analyzed and corrective actions taken. As FITD will be organized as a first level budget user, it is expected that the budgeting process will be similar.

12. ***Accounting System.*** MOES uses the Treasury system for its accounting and reporting. The Treasury system was assessed by the Bank's diagnostic work and found to be sound with reliable reporting and ex-ante controls. However, dedicated software for project accounting and reporting will be acquired as it is assessed to be beneficial for financial transparency and reliability of project data given the complexity of the Project and the need to consolidate all information in one place. The estimated funds needed for acquisition of the software are included in the budget for the project. The software needs to enable sufficient transparency of the use of project funds and allow proper preparation of the project financial statements, as well as preparation of the quarterly consolidated Interim un-audited Financial Reports (IFRs) on cash basis in the agreed format. The software needs to provide reliable accounting information, and be transparent with easily accessible information. As the FITD will disburse independently, the proceeds envisaged under Sub-component 3.2 of the Loan, it will have to ensure proper analytical records for the Project as well. The FITD will use the Treasury system, like the Ministry for its accounting and reporting and as a minimum will supplement the information contained in such system with more detailed records on the project transactions. The specific arrangements for the Project in terms of accounting would be assessed once the entity is established.

13. ***Accounting Policies and Procedures.*** Accounting books and records would be maintained on a cash basis with additional information on signed contracts. Project financial statements would be presented in Euro. The entities implementing the Project have to apply in practice a set of acceptable accounting procedures and internal controls including authorization and segregation of duties for the Project.

14. The specific mechanisms of the financial instruments (matching grants, soft grants, etc.) to be provided under the Loan would be also described in corresponding Grant Operational Manuals. Any transactions incurred under the grants should be properly disclosed in the project financial statements.

15. ***Internal controls.*** An appropriate system of internal controls for the Project will be instituted for the Project by both the Ministry, and the FITD. The main controls and procedures will be described in the Operational Manual (Financial Management Manual) and Grants Manuals, with emphasis on the roles and responsibilities to be assumed by the Ministry, and by the FITD respectively. Key internal controls to be applied for the Project include:

- appropriate authorizations and approvals;
- segregation of duties;
- different persons being responsible for different phases of transaction;
- reconciliations between records and actual balances, as well as with third parties should be performed on regular basis by the project Financial Officer; and

- original documentation filed and available for verification to support project transactions.

16. Adequate procedures and controls need to be instituted and applied in practice for grants to schools under Sub-component 2.2, and companies under Sub-component 3.2. The respective procedures will be designed to ensure use of funds for intended purposes and will be described in the Grant Manuals.

17. Key internal controls and procedures that need to be in place with respect to grants mechanism should include:

- clear description of eligibility criteria for beneficiaries;
- clear description of eligibility criteria for projects;
- procedures relating to evaluation and selection of grants, including determining and describing responsibilities for this process;
- procedures and processes of monitoring of grants implementation, including reporting back;
- time plan of the number and allocated time of the staff to perform activities relating to grant facility; and
- procurement processes for the grants.

18. Grant funds will flow from the Designated Accounts to the beneficiaries in accordance with the procedures described above in internal controls and flow of funds sections for other components and sub-components. Grant beneficiaries need to submit financial reports about the use of funds accompanied by relevant supporting documentation (contracts, invoices etc.); these are subject to review and approval by MOES, and FITD respectively, before subsequent installments of funds can be transferred to beneficiaries.

19. ***Reporting and Monitoring.*** Project management-oriented Interim un-audited Financial Reports (IFRs) would be used for project monitoring and supervision. The format of the IFRs will be attached to the POM. The PMU would produce a full set of IFRs covering all project components for each calendar quarter throughout the life of the Project. IFRs are due 45 days after each quarter end. FITD would report to MOES on the use of funds under Sub-component 3.2 within 30 days after each quarter end per the format of IFRs; the MOES would consolidate the information in order to prepare the said financial reports for the whole Project. IFRs will comprise the following reports presented in the agreed format: (i) Statement of Cash Receipts and Payments; (ii) Statement of Uses of Funds by Activity; (iii) Designated Accounts Statements, (iv) Statement of breakdown of sub-grants and sub-loans and (v) Narratives to the reports.

20. ***External Audit.*** The MOES is audited by the Macedonian State Audit Office (SAO) as any other government entity. However, as the capacity of the SAO for conducting efficient financial audit is still fairly limited, and given the complexity of the Project, the consolidated project financial statements would be audited in accordance with terms of reference acceptable to the Bank by a private sector audit firm acceptable to the Bank. The audit report would be submitted to the Bank no later than six months after the end of the audited period. The scope of audit will be extended from overall project financial statements, to audit of randomly selected financial statements of grant beneficiaries under Sub-components 2.2 and 3.2, and in relation to the use of grant funds. The full details on extending the scope of audit to include the review of grants would be added in audit TORs before the procurement of the audit commences. The

audited financial statements of the Project will be posted by the counterparts on the Ministry (or GOM) website, within 2 weeks upon the audit report is being issued by the auditors and accepted by the World Bank. The annual cost of the audit would be covered with project funds. The MOES will contract the auditors for all project components, including the innovation one. The audit should be conducted in accordance with International Standards of Auditing issued by the IAASB.

21. ***Funds Flow and Disbursement Arrangements.*** A transaction-based disbursement method would be used for the Project. In order to contribute towards building capacity within FITD on medium and longer term, it was discussed during appraisal that the new entity would manage independently the flow of funds under the innovation Sub-component 3.2. Two separate Designated Accounts (DAs) denominated in Euro will be opened by MOES, and FITD respectively in the National Bank of FYR Macedonia (NBRM), and will be mirrored by two local currency accounts within the Treasury Single Account to be used for payments to beneficiaries. The DAs would be used for withdrawals and payments of project funds only. The mirror Denar accounts would be opened within the Treasury Single Account to serve as operating accounts for withdrawals from the foreign currency account. The DAs would be managed and operated by the PMU and FITD respectively, with appropriate authorized signatories, which include a ministerial representative for the MOES DA, managed by the PMU. All transfers would take place through the DAs, with a corresponding transfer of the Denar-equivalent amount from the foreign exchange account. The accounts in Denars would be two transit accounts with zero balance.

22. Project funds would flow from the World Bank - *either* as an advance, via two DAs to be opened in NBRM, which would be replenished under transaction-based disbursement method, *or* by direct payment on the basis of direct payment withdrawal applications.

23. The PMU and FITD would prepare withdrawal applications for DA replenishment, to be signed by designated signatories and submitted to the World Bank. The first withdrawal would be a request for initial deposit (no supporting documentation needed), while each following withdrawal would be accompanied by supporting documentation of the expenditures incurred since the previous withdrawal. Payments from the DAs would be executed by means of payment orders. After all the procedures with respect to flow of documents, verifications and authorizations described in internal controls section are applied, payment order signed by designated signatories would be submitted to Treasury where the respective DA is opened for payment to suppliers/beneficiaries. In the case of Direct Payment, the application form for such method payment is submitted to the World Bank with the same authorized signatories as described above. In case of direct payment, funds are then transferred directly from the Bank account to the respective supplier/consultant. Applications for replenishment of the DAs would be submitted monthly or when one-third of the amount has been withdrawn, whichever occurs earlier. Documentation requirements for replenishment would follow standard Bank procedures as described in the Disbursement Handbook. Monthly bank statements of the DAs, which have been reconciled, would accompany all replenishment requests.

24. Flow of funds for grants would follow the same procedures as for other activities.

25. ***Financial Management Conditions.*** The following financial management and disbursement conditions, and respectively dated covenant need to be implemented for the financial management arrangements to be acceptable.

**Table 3: Financial Management and Disbursement Conditions**

| ***Description*** | ***Responsible entity*** | ***Due Date*** |
|---|---|---|
| Employment of a full-time qualified and experienced Financial Officer | MOES | Effectiveness of the Loan |
| Preparation of an acceptable Project Operational Manual, including financial management chapter as an integral part | MOES | Effectiveness of the Loan |
| Acquisition and installation of an acceptable accounting software for the project | MOES | 30 days after effectiveness |
| Preparation of an acceptable School-Industry Collaboration Grant Operational Manual | MOES | Prior to disbursement under sub-component 2.2 |
| Implementation of adequate financial management arrangements | FITD | Prior to disbursement under sub-component 3.2 |
| Preparation of an acceptable Innovation Grants Operational Manual | FITD | Prior to disbursement under sub-component 3.2 |

26. As described in the above table, disbursement under Sub-component 2.2 and Sub-component 3.2 is conditioned by preparation of Grant Operational Manuals describing the mechanisms in place in terms of selection, flow of funds, monitoring and evaluation, accounting and reporting on the use of funds, etc. Such manuals must be satisfactory to the Bank before their adoption. Furthermore, the establishment and appraisal of FITD represents a disbursement condition as well for the innovation sub-component.

*Procurement*

27. **Procurement risk assessment.** A procurement capacity assessment of MOES was carried out in July 2013. The general conclusion is that the current capacity in the MOES needs to be strengthened. A Working Group (WG) was founded at the beginning of the project preparation process. It comprises technical experts from the Ministry of Education and Science, Ministry of Labor and Social Policy, Ministry of Finance, Ministry of Economy, the Cabinet of the Deputy Prime Minister for Economic Affairs and the Vocational Education and Training Center. A Project Management Unit (PMU) would be established by the time of Project *effectiveness* within the Ministry of Education and Science. The PMU would be responsible for the overall project coordination, monitoring activities, fiduciary functions (procurement, disbursement and accounting), and reporting. The PMU would be managed by a Project Director and comprise a core team of full time, qualified and experiences Procurement Specialist, Financial Officer, and Coordinators for each Project component. The Coordinators for Innovation and Secondary TVET would provide additional support and supervision for the procurement activities of the grants beneficiaries. The procurement as well as review arrangements under the pilot financial instruments of Sub-component 3.2 will be elaborated in the Project Operational Manual. The grantees would have their own fiduciary responsibilities. During project preparation the Bank has cooperated with relevant staff from the Working Group and provided guidance with regard to procurement arrangements for the Project, the preparation of a Project Operational Manual, procurement plan and training plan.

28. **Risk Rating.** Given the current status of implementation arrangements and the fact that Implementing Agency has not yet identified a project implementation team, the Control and Project risks for procurement are identified as substantial. Residual Project Risk after mitigation measures are taken is identified as moderate. The thresholds for procurement of contracts under the Project are set in accordance with the ECA regional thresholds of January 2011.

29. **It is envisaged that the loan will finance various activities and contracts,** such as technical assistance for needs assessment and capacity building, external evaluation and memberships, including institutional evaluation of higher education institutions in FYR Macedonia, assessment of funding models, development of standards for vocational training, development of curricula, training and management support of school teachers, baseline and follow-up surveys, various individual consultants, core PMU staff, monitoring and evaluation, project audit, various specialized and standard software and hardware, various types of equipment for secondary TVET school training centers, for the PMU, for the FITD, grants to support development of accelerators, to support start-up and innovation of micro and small enterprises and spin-off companies, grants for transfer of technology. The PMU will coordinate with the relevant project beneficiaries and departments in the MOES with regard to the preparation of the TORs and technical specifications for the various contracts for consultant service, technical services (as relevant) and goods. During project implementation, in case of need, an additional technical support in the areas of the subject contracts indicated above, and external consultants to assist the PMU and the beneficiaries might be required to strengthen the PMU capacity.

30. **Applicable Guidelines.** All goods and consultants' services required for the activities and to be financed out of the proceeds of the Loan shall be procured in accordance with the requirements set forth in World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consultant Services under IBRD Loans and IDA Credits & Grants by the World Bank Borrowers" dated January 2011, and "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by the World Bank Borrowers" dated January 2011, and the provisions stipulated in the Legal Agreement.

31. **Particular Methods for Procurement of Goods, Works and Non-Consulting Services.** Contracts for various goods and non-consulting services shall be procured following one of the methods: International Competitive Bidding (ICB); National Competitive Bidding (NCB), subject to the additional procedures stipulated in the Annex to Schedule 2 of the Loan Agreement and applicable for contracts below the threshold indicated in the Procurement Plan; Shopping, applicable for contracts below the threshold indicated in the Procurement Plan; and Direct Contracting, subject to sufficiently detailed justification in accordance with par. 37 of the World Bank's "Guidelines: Procurement of Goods, Works, and Non-Consultant Services under IBRD Loans and IDA Credits & Grants by the World Bank Borrowers" dated January 2011. Contracts for goods, works and non-consultant services to be financed through matching grants and sub-loans provided to private sector entities under Component 3, may be awarded in accordance with established private sector or commercial practices which have been found acceptable to the Bank in accordance with the provisions of par. 3.13 Procurement in Loans to Financial Intermediary Institutions and Entities. The POM, to be prepared and adopted by Loan Effectiveness, shall elaborate on the acceptable private sector and commercial practices, as well as the specific procurement and review arrangements under the innovation instruments. Contracts for goods, works and non-consultant services to be financed through matching grants

and sub-loans provided to public sector entities under Component 3, shall be awarded in accordance with the procurement methods as stipulated above and in the Loan Agreement.

32. **Particular Methods of Procurement of Consultants' Services.** The following methods of procurement of Consultant's Services for those contracts which are specified in the procurement plan shall be applicable under the Project: Quality and Cost Based Selection (QCBS), Quality-based Selection (QBS), Least Cost Selection (LCS), Selection under a Fixed Budget (FBS), Consultants' Qualifications (CQ), Single-sours Selection of consultant firms, Selection of Individual Consultants, and Single-source procedures for the Selection of Individual Consultants. Contracts for consultants' services to be financed through matching grants and sub-loans provided to private sector entities under Component 3, may be awarded in accordance with established private sector or commercial practices which have been found acceptable to the Bank in accordance with the provisions of par. 3.13 Selection of Consultants in Loans to Financial Intermediary Institutions and Entities. The POM, to be prepared and adopted by Loan Effectiveness, shall elaborate on the acceptable private sector and commercial practices, as well as the specific procurement and review arrangements under the innovation instruments. Contracts for consultants' services to be financed through matching grants and sub-loans provided to public sector entities under Component 3 shall be awarded in accordance with the methods for selection of consultants as stipulated above and in the Loan Agreement.

33. Short-lists may comprise entirely of national consultants (firms registered or incorporated in the country), if the assignment is below the ceiling established in the Procurement Plan approved by the Bank.

34. **Training and Training Plan**. The institutions providing standard training, conducting seminars and organizing study tours would be selected on the basis of analysis of the most suitable program of training offered by the institutions, availability of services, the period of training and the reasonableness of cost. However, individual consultants hired to deliver training under the Project shall be selected in accordance to the selection of individual consultants' procedures as stipulated in the *Consultant Guidelines* applicable to the project. An annual training plan shall be prepared and agreed with the Bank. It will include information on the title of training, institution that shall provide it, timeline, cost, number, position and names of relevant people to be trained. The training plan shall be updated in agreement with the Bank through the duration of the Project at least annually or as required to reflect the actual project implementation needs.

35. **Universities**. In cases where the services of state owned-universities, research institutes, and/or specialized education institutes are required for some project specific assignments, a justification in accordance with paragraph 1.11 of the applicable *Consultant Guidelines* would be presented to the Bank for review on a case-by-case basis to determine eligibility. In addition, in cases where specialized services are required and which are known to be provided by only one university or a specialized education institution, a justification in accordance with paragraph 3.8 through 3.11 of the applicable *Consultant Guidelines* would be presented to the Bank for review on a case-by-case basis to determine relevance of the proposed approach.

36. **Procurement Plan and Procurement Arrangements**. The Procurement Plan for the entire life of the Project was prepared during project preparation and its final version was agreed at project negotiations. The Procurement Plan for project implementation provides the basis for procurement methods as well as the procurement review arrangements. In the procurement plan,

all contracts are grouped in packages as much as possible to encourage better competition. It will be available at the PMU, and on the Bank's external website. The Procurement Plan shall be updated in agreement with the Bank through the duration of the Project, at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity. All procurement plans and their updates or modifications shall be subject to the Bank's prior review and no-objection before implementation. The initial Procurement Plan has been published on the Bank's external website; the same will be done to all subsequent updates once the Bank has provided a no-objection. Given the demand-driven nature of *the innovation instruments*, it is not possible to prepare a procurement plan for them as per paragraph 1.18 of the Procurement and paragraph 1.25 of the *Consultant Guidelines***.** The POM will include a template of procurement plan for *the innovation instruments*.

37. **Post-review Arrangements and Frequency of Procurement Supervision**. Contracts not subject to the Bank's prior review would be post reviewed by the Bank' procurement specialist assigned to the Project. Post review of contracts would be carried out once per year. At a minimum one out of five contracts would be randomly selected for post review. The POM will elaborate on the detailed provisions for post-review of *the innovation instruments.* Provided that they are a significant number, it is recommended that the Bank hires a consultant to carry out performance review of the sub-projects, which should also include review of procurement.

38. **Risks and Mitigation Measures**. The following measures were agreed to mitigate the risks for procurement management and to maintain the implementing team's capacity:

(i) A qualified and experienced Procurement Specialist to be hired as soon as possible, but not later than project effectiveness.

(ii) Project Operational Manual (POM) to be prepared and adopted, including a detailed description of overall procurement arrangements under the Project, as well as procurement arrangements under Component 3 with regard to the specific funding instruments (grants).

(iii) The procurement section of the POM shall, among other things, elaborate on the roles and responsibilities in the management and coordination of the procurement process, preparation of terms of reference and technical specifications, evaluation, establishment and appointment of evaluation committees, conflict of interest mitigation measures, record keeping, contract management, a complaint handling mechanism, roles and responsibilities of the parties involved in the procurement process under sub-financing of sub-projects for innovation programs, etc.

(iv) The Grant Operational Manual will include details with regard to procurement and review arrangements of goods, non-consulting and consulting services for the innovation instruments/grants, as well as a template of the procurement plan template for the purposes of the *innovation instruments.*

(v) The staff who will be involved in the procurement process shall attend training in procurement with a focus on the Bank's *Procurement and Consultant Guidelines* of January 2011 and the revised bidding documents and documents for selection of consultants. As an alternative, the Bank can carry out a tailor made training on the above topics after project approval.

(vi) During project implementation, in case of need, additional technical support for preparation of TORs in the areas of consultant contracts planned to be financed from the loan proceeds might be required to strengthening the PIU capacity.

*Environmental and Social (including safeguards)*

39. **Social**. The Project would not trigger Social Safeguards. Nonetheless, its results framework would capture data disaggregated by gender, whenever possible/available. Institutions that receive project grants would be asked to provide team data disaggregated by gender. Every innovation grant proposal would be reviewed to avoid any negative social implication and/or potential gender bias.

40. **Environmental**. The FITD would screen sub-projects/grants to: (i) ensure compliance with the World Bank Group exclusion list; (ii) ensure that no sub-projects with significant impacts of a Category A type are supported; and (iii) that sub-projects/grants will not necessitate involuntary land acquisition.

**Monitoring and Evaluation**

41. The Project would include an M&E framework to enable decision makers to track performance, adjust implementation as needed, and demonstrate the impact of policy interventions financed by the Project.

42. The PDO level and intermediate results indicators would be monitored using the following sources and methodologies: (i) regular data collection process; (ii) baseline and follow-up surveys; and (iii) evaluation reports.

43. The Project Director would be responsible for bringing together the reports and representatives of MOES and FITD for monitoring of the PDO and results, and communicating with the World Bank according to the frequency of reports described in Annex 1. M&E under the Project would be integrated into regular monitoring functions of MOES and FITD. MOES is expected to build a database to monitor key performance indicators that will continue to be regularly updated.

44. Ex-post evaluations would be carefully designed and performed for selected programs. Likewise, a performance evaluation to assess and review implementation of the competitively awarded grants in secondary TVET.

45. The M&E framework for the FITD component aims to measure input, output, and behavioral additionality[12]. In order to understand whether the financial support provided through the FITD instruments is being effective, the three components of additionality will be tested together. The evaluation will help determine whether the R&D and Innovation activity are being carried out without public support, whether the public funding affects the scale and scope of the R&D and Innovation, and whether the R&D and Innovation are done differently.

46. Survey instrument design will be a highly structured questionnaire (preferably web-based) and addressed to directors/owners of the companies followed by in-person interview. To ensure a good mix, firms of all ages, sizes, and sectors will be approached. For the qualitative methodology semi-structured interviews will be conducted in order to explore the interviewees'

[12] Additionality in innovation stimulation distinguishes between 'input' additionality ( e.g. the increase in private R&D investment as a consequence of awarding public support), 'output' additionality (the increase in innovation performance as a consequence of awarding public support) and 'behavioral' additionality (the change of innovation behavior as a consequence of awarding or changing the conditions of R&D support).

experience regarding the FITD program. Based on these interviews, case studies will be developed.

47. Items used to assess input additionality will be: scope and scale of the project had they not received grant; and R&D intensity before and after the grant, etc. Items used to assess output additionality are: number of new products/services introduced to the market; number of new products/services under development etc. Items used to assess behavioral additionality are: innovation development process, new employment, R&D collaboration etc.

(i) *Input additionality* is examined following two approaches. The first approach is where input additionality is evaluated by asking recipient firms what they would have done if they had not received the subsidy (adjusted scale of the project, development time, etc.). The second approach follows the "crowding out" literature. In order to examine if firms substituted any of the public money for their own investment, the values of own and total R&D intensity would be compared before and after the beginning of the FITD grant.

(ii) *Output additionality*. In general, output additionality is difficult to measure because a clear direct link between specific innovation project and innovation output is hard to identify due to inter- and intra-firm spillovers. Spillovers from FITD are also considered benefit of the program, and output will be assessed by number of new products introductions and number of new products in development.

(iii) *Behavioral additionality*. Given that FITD is geared toward fostering innovations, the first step is examining changes in the new product development process which is closely related to innovation capability of the firm.

# Annex 4: Operational Risk Assessment Framework (ORAF)

**Macedonia, FYR : Skills Development and Innovation (P128378)**

## Risks

### 1. Project Stakeholder Risks

| **1.1 Stakeholder Risk** | Rating | Moderate |
|---|---|---|

Risk Description:

There are four key risks: (i) the proposed reforms could face opposition from stakeholders; (ii) academics are used to operating under public sector rules and it will take time for a culture of innovation and cooperation with private sector to take root; (iii)local firms have weak capacity to apply for and utilize innovation funds effectively; and (iv) there is a lack of institutional links between the public research institutions and private sector.

**Risk Management:**

Consultations were held with stakeholders from the higher education and innovation communities during project preparation. Further stakeholder consultations and communications outreach activities are planned for the implementation phase to explain reforms, garner their views and support.

| Resp: | Status: | Stage: | Recurrent: | Due Date: | Frequency: |
|---|---|---|---|---|---|
| Both | In Progress | Both | ☑ | | CONTINUOUS |

**Risk Management:**

The new VET Strategy and Action Plan proposes the formation of Occupational Councils for each occupational area. The Councils will be comprised of representatives from VET Center, VET providers, business sector and local government.

| Resp: | Status: | Stage: | Recurrent: | Due Date: | Frequency: |
|---|---|---|---|---|---|
| Client | Not Yet Due | Implementation | ☑ | | CONTINUOUS |

**Risk Management:**

The Innovation Strategy was developed through a broadly inclusive consultative process with the public, research and private sector, and with substantive inputs from all sides. Further, training and voucher programs funded by donors and aimed at increasing the innovative capacity of firms and providing expertise and limited seed funding will help with an initial pipeline of firms who could develop sound project proposals and apply for funding from the Innovation Fund (FITD).

| | | | | | | |
|---|---|---|---|---|---|---|
| | Resp: Client | Status: Not Yet Due | Stage: Implementation | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS |

| 2. Implementing Agency (IA) Risks (including Fiduciary Risks) | | | | | | |
|---|---|---|---|---|---|---|
| **2.1 Capacity** | Rating: High | | | | | |
| Risk Description:<br><br>There are two key risks: (i) Weak institutional capacity at the Ministries to implement large scale projects, including coordinating amongst them; and (ii) the time needed for the Innovation Fund to effectively deploy the resources under this operation, given the complex structure and weak absorption capacity of the private sector and innovation system. | **Risk Management:**<br><br>The risk of low level of coordination will be addressed through the proposed implementation structure, and close supervision by the Bank, including the locally based Task Team Leader and Private Sector Development Specialist. The staffing knowledge gaps would be covered through the selective use of external consultants with relevant qualifications and experience, and through training. | | | | | |
| | Resp: Both | Status: In Progress | Stage: Both | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS |
| | **Risk Management:**<br><br>The Project was designed to minimize the risks associated with the weak absorption capacity of the private sector. The mitigation measures include: (i) dividing implementation in two phases, giving time for capacity to be built up before scaling-up the investment resources; (ii) supporting a balanced mix of grant programs based on competitive selection mechanisms and larger investments in innovation infrastructure; and (iii) using simple instruments that have been tried-and-tested in different environments to ensure faster selection and disbursement of funds. | | | | | |
| | Resp: Both | Status: In Progress | Stage: Both | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS |

| 3. Project Risks | | | | | | |
|---|---|---|---|---|---|---|
| **3.1 Design** | Rating: Moderate | | | | | |
| Risk Description:<br><br>Project risks include: (i) weak institutional capacity of key implementing agencies to engage required stakeholders; and (ii) low capacity of the local firms to utilize innovation | **Risk Management:**<br><br>Close implementation support by the Bank team and the locally based TTL<br>Reforms are expected to be phased in. | | | | | |
| | Resp: Both | Status: Not Yet Due | Stage: Implementation | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| funds effectively. | **Risk Management:**<br>FIDT operation will support a balanced mix of grant programs and simple instruments that have been tried-and-tested in many different environments will be adopted to ensure faster selection and disbursement of funds. | | | | | | |
| | Resp: Client | Status: Not Yet Due | Stage: Implementation | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS | |
| **3.2 Social and Environmental** | Rating | Low | | | | | |
| Risk Description:<br>Failure to comply with the Project Environmental Management Framework (EMF). | **Risk Management:**<br>The Bank will supervise whether EMPs are being prepared as part of grant funding application, and randomly review the adequacy of such EMPs. The Loan Agreement includes a covenant enabling the Bank to suspend the loan in case of failure to comply with the EMF. | | | | | | |
| | Resp: Both | Status: Not Yet Due | Stage: Implementation | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS | |
| **3.3 Program and Donor** | Rating | Low | | | | | |
| Risk Description:<br>The project may overlap with other donor initiatives or, on the contrary, may be implemented in isolation without benefiting from synergies and pipeline of innovative sub-projects and ideas for support. | **Risk Management:**<br>Project design took into consideration complementary activities supported by other agencies to avoid duplication. There are on-going discussions with the European Commission on possibilities for scaling up the FITD in the second phase using Instrument for Pre-accession (IPA) resources. | | | | | | |
| | Resp: Both | Status: In Progress | Stage: Both | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS | |
| **3.4 Delivery Monitoring and Sustainability** | Rating | Moderate | | | | | |
| Risk Description:<br>The capacity of the MOES to carry out the monitoring and evaluation functions for the Project is weak. | **Risk Management:**<br>The Project will finance technical assistance and capacity building for the introduction of modern management practices, including development and implementation of the central data base essential for monitoring the operation and outputs of the tertiary and VET education. | | | | | | |
| | Resp: Client | Status: Not Yet Due | Stage: Implementation | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS | |
| The sustainability of the changes proposed to be brought about the Project would depend on long-term commitment from the Government, particularly as their positive impact would not | **Risk Management:**<br>The Project will ensure close collaboration with the European Commission, the MOES and the Office of the | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| be as visible in the short-term. | Deputy Prime Minister for Economic Affairs, in order to leverage EU/IPA funds to complement project activities and/or sustain them after project completion. | | | | | |
| | Resp: Client | Status: Not Yet Due | Stage: Implementation | Recurrent: ☑ | Due Date: | Frequency: CONTINUOUS |
| **3.5 Other (Optional)** | Rating | | | | | |
| Risk Description: | **Risk Management:** | | | | | |
| | Resp: | Status: | Stage: | Recurrent: | Due Date: | Frequency: |
| **3.6 Other (Optional)** | Rating | | | | | |
| Risk Description: | **Risk Management:** | | | | | |
| | Resp: | Status: | Stage: | Recurrent: | Due Date: | Frequency: |

4. Project Team Proposed Rating Before Review

| **Overall Preparation Risk: Moderate** | **Overall Implementation Risk: High** |
|---|---|
| Risk Description:<br><br>Key risks involve cooperation between different government institutions during project preparation and governance of the proposed Innovation Found. While the leadership of the Project implementation will be under the Ministry of Education and Science, it will require major coordination and cooperation with the Ministry of Economy and the Ministry of Finance. Steps for mitigating these risks have been taken from the onset of project preparation, including the establishment of a balanced Working Group and Inter-Ministerial Council, with members from each Ministry to work collectively and oversee the Project preparation and implementation on the part of the Government. The leadership at the Ministry of Education and Science and the Prime Minister's office is committed to the objectives of the proposed Project. | Risk Description:<br><br>The key risks affecting this project are: opposition by public universities staff, low capacity of the local firms to utilize innovation funds effectively, weak institutional links between the public research institutions and private sector as well as between the state agencies and stakeholders in the VET sector. The proposed reforms seek to increase efficiency and accountability of the HE sector which involves changes in funding formula, pedagogical approaches and management practices, reforms which may meet resistance on the part of institutional leaders and other stakeholders. The low capacity of the local firms to utilize innovation funds effectively and lack of institutional links between the public institutions and private sector may have negative impact in achieving PDO outcomes. |

5. Overall Risk

| **Overall Preparation Risk:** **Moderate** | **Overall Implementation Risk:** **High** |
|---|---|
| Risk Description:<br><br>Key risks involve cooperation between different government institutions during project preparation and governance of the proposed Innovation Found. While the leadership of the Project implementation will be under the Ministry of Education and Science, it will require major coordination and cooperation with the Ministry of Economy and the Ministry of Finance. Steps for mitigating these risks have been taken from the onset of project preparation, including the establishment of a balanced Working Group and Inter-Ministerial Council, with members from each Ministry to work collectively and oversee the Project preparation and implementation on the part of the Government. The leadership at the Ministry of Education and Science and the Prime Minister's office is committed to the objectives of the proposed Project. | Risk Description:<br><br>The main implementation risks are associated with the negligible initial capacity of the nascent FITD as its capacity development is a major component of the project. Similarly, low capacity among enterprises to prepare project proposals and provide their share of financing is a potential risk during implementation. FITD will provide mentoring to entrepreneurs and the Investment Committee would be afforded the flexibility to adjust the matching components of the financial instruments based on the project pipeline.<br>Risks associated with governance, particularly of the FITD, would be mitigated by tight monitoring and supervision. During project preparation, the Bank reviewed the proposed governance structure for the establishment of the Fund, by working closely with the MOES and with the Deputy Prime Minister's Office on the drafting of the Law to ensure that the governance structure represents the private sector and research and innovation community as the main stakeholders of the Project. Most importantly, the governance structure includes an Investment committee of international experts who will be responsible for making investment decisions. The existence of this committee increases the transparency and objectivity of the investment process. The Bank has also advised the Macedonian government in establishing rulebooks for the various FITD instruments that will create clear rules and guidelines minimizing any abuse of authority and limiting arbitrary decisions while maintaining adequate flexibility in disbursement of funds to applicants However the FITD will be appraised to the Bank's satisfaction before disbursements can be made to piloting financial instruments by FITD.<br>Finally, the school-industry and business innovation Grants Sub- components involve risk for flow of funds and internal controls. The risk would be mitigated by preparation of two Grants Manuals, which will describe all relevant procedures relating to their specific mechanism and that would be a disbursement condition for the respective sub-components of the project. |

## Annex 5: Implementation Support Plan

## FYR MACEDONIA: Skills Development and Innovation Support Project

1. **Implementation Strategy:** The strategy for the Implementation Support Plan would include on-going dialogue with the Government, joint review of the project implementation and regular oversight of the project fiduciary activities. Regular dialogue and close implementation support, led by the locally based staff, including team leader, and the Private Development Specialist, would facilitate early identification of problems and obstacles, which could delay implementation and would enable timely provision of technical advice and support to remove such obstacles. Joint reviews would take place twice a year aimed at reviewing progress and achievement of the agreed results. The objective of the first review would be to check whether agreed results regarding the establishment of FITD, funding formula for Higher Education and development of an overarching model for secondary TVET have been achieved. During each of the reviews, the type of implementation support that is needed would be identified, followed by joint decisions on specific necessary assistance.

**Fiduciary Requirements**

2. **Financial Management Implementation Support and Supervision Plan.** During project implementation, the Bank would supervise financial management arrangements in two main ways: (i) review the project IFRs for each calendar quarter, as well as the annual audited project financial statements and the correspondent auditor`s management letter; and (ii) perform on-site supervision with the frequency based on the assessed project risk and performance (first supervision in maximum 12 month time after the assessment), and review the project financial management and disbursement arrangements to ensure compliance with the World Bank's minimum requirements. The on-site supervision would include a review of the following areas of project financial management: accounting and reporting, internal control procedures and external audits, planning and budgeting, funds flow and staffing arrangements. The review would include all types of payments, namely operating cost, acquisition of goods and services, and particular attention will be paid to procedures applied for grants to universities/companies. A sample transactions review would also be conducted. Implementation support and supervision would be performed by the Bank Financial Management Specialist.

3. **Procurement supervision:** Prior review supervisions would be carried out by the Bank, in accordance with the procurement thresholds. In addition, in compliance with the results of the capacity assessment of the Implementing Agency, there will be one supervision visit every year to visit the field and carry out post review of procurement actions. These supervision visits could include informal training.

4. The PMU would maintain complete procurement files, which would be reviewed by the Bank during supervision visits. All procurement related documentation that requires Bank prior review would be cleared by the Bank Procurement Accredited Staff (PAS) and relevant technical staff. No packages above mandatory review thresholds by Regional Procurement Advisor are anticipated. Procurement information would be recorded by the PMU and submitted to the MOES and the Bank as part of the quarterly IFR and annual progress reports. A simple management information system with a procurement module would be used to assist the PMU Procurement Officer to monitor all procurement information.

5. **Implementation Support Plan:**

| Time | Focus | Skills Needed | Resource Estimate | Partner Role |
|---|---|---|---|---|
| First twelve months | Technical Review:<br>Concept of the new higher education funding model<br>Model for secondary TVET<br>Training of the HEAEB and Action plan for External Evaluation of HEIs<br>Capacity Building of the Innovation Fond<br>Fiduciary Oversight:<br>Financial Management<br>Procurement | <br>Education Specialists<br><br>Education Specialist<br>Education Specialists<br><br><br>Economist (Private Finance and Innovation), Private Devt. Spec.<br><br>FM Specialist<br>Procurement Specialist | 47 staff weeks | |
| 12-60 months | Technical Review:<br>Implementation of a cost per student methodology<br>External Evaluation of HEIs<br>Development of occupational standards<br>Selection of Beneficiaries and disbursement of MG<br>Fiduciary Oversight:<br>Financial Management<br>Procurement | <br>Education Specialist / Financing Specialist<br>Education Specialists<br>Education Specialist<br>Economist (Private Finance and Innovation), Private Devt. Specialist<br><br>FM Specialist<br>Procurement Specialist | 52 staff weeks | |
| Other | Technical Review:<br>Implementation of a comprehensive funding model<br>External evaluation in HEIs<br>Skills Observatory<br><br>Selection of Beneficiaries and disbursement of MG<br>Fiduciary Oversight:<br>Financial Management<br>Procurement | <br>Education Specialists / Financing Specialist<br>Education Specialists / Education Specialist / Economist<br>Economist (Private Finance and Innovation), Private Development Specialist<br><br>FM Specialist<br>Procurement Specialist | 52 staff weeks | |

## 6. **Skills Mix Required**

| Skills Needed | Number of Staff Weeks | Number of Trips | Comments |
|---|---|---|---|
| Task Team Leader | 10 | 0 | Local WB staff |
| Senior Education Specialist | 6 | 3 | |
| Economist (Labor Market) | 3 | 2 | Trips will be combined with other project support |
| Economist (Private Finance and Innovation | 6 | 3 | |
| Private Sector Development Specialist | 6 | 0 | Local WB staff |
| Environmental Specialist | 4 | 1 | Trips will be combined with other project support |
| Procurement Specialist | 2 | 2 | Trips will be combined with other project support |
| Financial Management Specialist | 2 | 2 | Trips will be combined with other project support |

## Annex 6: Sectoral and Institutional Context

## FYR MACEDONIA: Skills Development and Innovation Support Project

### Higher Education

1. The higher education sector in FYR Macedonia consists of 5 public and 9 private universities and 5 non-university private institutions, enrolling about 58,000 students, 85% of whom are attending public universities. Despite the recent interventions of the Government to increase enrollment at the tertiary level, the gross enrollment rate is still far below the new EU countries.

**Table 4: Gross Tertiary Enrollment Ratio (2010) in FYR Macedonia and SEE countries**

| Country | % of age-appropriate population |
|---|---|
| Slovenia | 87 |
| Romania | 59 |
| Bulgaria | 57 |
| Slovakia | 55 |
| Croatia | 54 |
| FYR Macedonia | 39 |

*Source:* World Bank

2. Beyond the question of numbers of students, the country also faces significant challenges concerning the quality of higher education. System efficiency remains low, with high drop-out rates and long average times to completion. Although in the last two years the efficiency was slightly improved, in 2010 only 38.8 percent of the total number of students graduated on time.

3. Data from the World Economic Forum (WEF) are useful to benchmark the position of FYR Macedonia among the republics of the former Yugoslavia. The WEF analysts consider three stages of economic development, from factor-driven (Stage I) to efficiency-driven (Stage II) to innovation-driven (Stage III). Bosnia Herzegovina, FYR Macedonia, Montenegro and Serbia are at Stage II, Croatia is in transition between Stage II and Stage III, and Slovenia is at Stage III.

4. Table below shows the overall competitiveness rank of the countries, the rank with regard to tertiary gross enrollment, the rank with respect to the quality of research services, and the extent to which the quality of education is perceived as a problem by the business community (out of 16 possible obstacles).

**Table 5: Competitiveness and Higher Education (2012)**

| Country | Overall WEF Rank | Tertiary Education Enrollment Rank | Quality of Research Services | Perception of Education as an Obstacle* |
|---|---|---|---|---|
| Bosnia Herzegovina | 88 | 68 | 113 | 15 |
| Croatia | 81 | 47 | 74 | 11 |
| FYR Macedonia | 80 | 65 | 87 | 2 |
| Montenegro | 72 | 55 | 89 | 4 |
| Serbia | 95 | 52 | 125 | 14 |
| Slovenia | 56 | 5 | 50 | 15 |

*Note:* A rank of 1 signifies that education is perceived as the top obstacle, a rank of 15 means that education is the least important obstacle.

5. These data confirm the relatively good score of FYR Macedonia as far as overall competitiveness of the economy but the country's scores on access to higher education and on the "quality of research services" are less good. Furthermore, FYR Macedonia is the only country where the business community perceives the poor quality of education as a very serious obstacle to competitiveness.

6. It is difficult to get an objective sense of the quality and relevance of the programs taught at the FYR Macedonia universities in the absence of objective external measures. The limited evidence provided by a 2010 World Bank employer survey of the demand for skills showed that employers continue to find it difficult to hire workers with the skills they require, particularly workers who possess the higher order skills needed in the newly created jobs. As the Bank study reveals, modern and dynamic firms are more affected by the skills shortage than traditional firms because they are more likely to require high and medium-level non-manual skills than traditional firms. The consequence of not addressing this skills shortage may be a stagnation of the growth and expansion of the modern Macedonian economy.

7. The lack of outcome data and of an existing culture for internal and external quality assurance constrains the enhancement of quality and relevance of higher education. Procedures for internal and external quality assurance are, to a large extent, insufficient and need to be better aligned with recent European developments. The newly established Board for Higher Education Accreditation and Quality Assurance has been focused only on the accreditation of institutions and study programs thus far. The next step must include an external evaluation of higher education institutions and the linking of evaluation outcomes with institutional accreditation. The cornerstone of a sound quality assurance system, however, is effective internal quality assurance, i.e. quality assurance mechanisms institutionalized and routinized at the universities themselves. Significant capacity building measures and sufficient resources should be provided in order to make this part of the system work well and to support the development of an internal quality culture without which quality assurance remains too far removed from normal modes of operations to be embedded within the basic institutional ethos of every university.

8. The higher education system also faces funding and strategic management constraints, and reforms are needed to align with good EU practices. The targeted government interventions to increase the number of students at the tertiary level have not been matched by an adequate increase of resources in the public higher education sector[13]. Thus, as recent reports note, several public universities lack basic infrastructure and quality personnel to address efficiently the gap between educational outcomes in tertiary education and labor market needs, as well as the gap between the current state of higher education in FYR Macedonia and its European comparator countries.[14] In particular, much work is needed to align FYR Macedonia's competitiveness agenda in the framework of the EU2020 Strategy, the Bologna Process and other important regional higher education developments. Further investments in the sector will be needed to make Macedonian HEIs competitive in this wider European context and provide the labor force for a prosperous economic development of the country.

[13] In 2010, 1.36 % of the GDP was allocated for higher education and 1, 22 % in 2011

[14] Ss. Cyril and Methodius University in Skopje, EUA Follow Up Evaluation Report, 2011; Ziegele at all, Higher Education Funding in Macedonia, 2011

9. The current input-oriented funding model budgets staffs, materials and investment expenditures in an isolated, line-item way. The current model, in fact, only consists of one component--basic funding. The lack of reliability regarding the allocation of the budget leads to a situation where the important stability function of basic funding is insufficient. There is also no multi-year financial perspective. The second pillar of performance-oriented funding and the third pillar of pre-financing innovative projects do not exist at all. This leads to a lack of performance incentives and to limited financial opportunities for universities to pursue new initiatives and projects. Financing reform for higher education will need to put a specific emphasis on the introduction of performance based components, first on the system level but in the longer run also on the institutional level in order to strengthen high performers and areas of strategic importance.

10. The current institutional structure of powerful and semi-autonomous faculties within universities in the country underlines many of the problems identified above and therefore hampers the development of the public universities. [15] A modern allocation model which relies on output-based funding, including measures of the quantity and quality of teaching and research will also facilitate better integration of faculties within the universities and improve the effectiveness, efficiency and accountability of higher education institutions.

11. Finally, the higher education sector in FYR Macedonia has not developed a centralized mechanism for supporting innovative implementation of research output or technology transfer to and/or from external agencies such as foreign researcher and enterprises. Such a mechanism is imperative for linking the higher education sector to the innovation elements of the FYR Macedonian economy and to promote implementation of innovative engagements between research and firms.

**Vocational Education and Training**

12. Vocational Education and Training in FYR Macedonia is largely focused on formal secondary school vocational education and training under the auspices of the MOES. Although the recently approved *Strategy for Vocational Education in a Lifelong Learning Context: Better Skills for a Better Tomorrow* makes frequent reference to the need for a more flexible provision with a greater emphasis on vocational training for adults, the assumption is that such provision would be located in schools of the formal VET system and using curricula approved by the MOES. Given the local context this would seem the only feasible option, at least in the short or medium term. However, the school system does not at present have the expertise, flexibility or structures to perform this function adequately.

13. The Secondary VET system in FYR Macedonia offers vocational education with duration of four years in 14 occupations with 50 educational profiles, art education (visual art and music), sports gymnasium, as well as programs of three-year duration with 36 educational profiles. Over half of young people between the ages of fifteen and nineteen who are in secondary education attend a VET school. VET provision has seen profound changes in the past twelve years, the

[15] The law of Higher Education Law stipulates Integrated Universities. But implementation of law has not been effective especially in the cases of two biggest and oldest universities in Macedonia.

most important being linked to the four-year VET provision that accounts for 59.5% of all secondary school students and for 94.9% of students in VET.

14. These reform initiatives (implemented in 4 phases, from 1998 to 2006) upset the status-quo of existing four-year VET programs through multiple interventions: new syllabi and curricula were designed, occupational areas and profiles were revised, schools were provided with new and modern equipment and teaching aids, training was organized for teachers on using the new equipment and on the application of contemporary learning models. Those were important outputs of the reform initiatives but unfortunately the impact/outcomes remain unknown, since the implementation of the reform was not regularly monitored and evaluated. Despite considerable reforms of some elements of formal TVET provision over the last 15 years, there is a lack of coherence in development, along with weaknesses in planning and policy development processes, and an absence of systematic quality management at all levels.

15. The reformed VET system failed to incorporate mechanisms to respond quickly to labor market demands and to be an appealing option for the parents and students. A baseline data survey (MOES and ETF) that was done to inform the development of a new strategy for Vocational Education and Training found that the quality of VET is not at a satisfactory level, neither from the aspect of employability and availability of professional competencies of graduates, nor from the aspect of available competencies of young people to continue their education.

16. A 2010 World Bank employer survey of the demand for skills showed that modern firms demand different skills than traditional ones. This is particularly acute for modern firms[16] that attach a particularly high value to the knowledge of a foreign language and to ICT skills and solid technical/vocational skills. Modern firms also seek workers who have higher levels of cognitive and behavioral skills, such as problem solving, initiative, and ability to organize one's work independently, skills not being promoted in the VET sector as yet.

17. Diversification starts very early, with students having to choose a general or vocational education track after completion of primary education, i.e at the age of 14. The idea that early vocational tracking may harm students, particularly the worst performing students, and that diversification should start after students have demonstrated the acquisition of strong basic skills seems to be a consensus in the literature.[17] Given the proportion of Macedonian eight grade students who achieve the minimum standard (the 'low international benchmark') in TIMSS 2011 assessment[18] and given that the admission requirements for the VET are less demanding compared to the general secondary schools, the foundation stone of the reform should be to shift from the narrow occupational training to the broader technical and transversal skills for employment and promotion of flexible paths between vocational training, general education and higher education.

[16] Export-orientated or the firm having a website as a proxy for modernity was used in this survey

[17] There is a need for further exploration of the fact that there appears to be consensus among stakeholders that time spent on practical training has to be increased, and general education decreased or 'contextualised', as this *runs counter to most recent research findings* on the importance of general education and transferable skills, especially for lower ability students

[18] 61 percent in mathematics and 53 percent in science

18. The network of the secondary TVET schools has seen many changes in the last 20 years and all being supply-driven mainly to prevent possible lay off of the teachers and to increase enrollment in secondary education, given the limited number of the general secondary schools in the country. The current network is inefficient because the number of places in TVET schools exceeds the number of pupils; the same programs are being implemented in adjacent schools and most importantly it does not corresponding to the requirements of the local businesses and the labour market demands.

19. The other shortcomings in the current secondary VET system related to economic relevance are: (i) lack of sufficient collaboration among schools, employers and companies; (ii) a predominantly supply-driven orientation where the principal incentive is to fill existing programs and use existing teachers and facilities rather than adapt to changes in the market; (iii) obsolete program content and incongruence with market requirements; and (iv) overspecialization of the curriculum leading to narrow skills and lack of sufficient foundation skills for learning on the job and becoming lifelong learners as needed in a market economy.

20. Finally, the lack of recurrent investment in secondary VET schools has resulted in obsolete and worn-out facilities and equipment. Additional challenges include teachers and instructors lacking opportunities for in-service training or the chance to learn about good practices elsewhere, including more effective teaching methods.

21. The secondary VET system in FYR Macedonia faces challenges in terms of its relevance, management, quality, and internal efficiency. The proposed project interventions in the secondary TVET set the basis for transformation of the system from the narrow occupational to a more general and broader technical education and will enforce the focus on competencies and skills relevant for job market.

**Innovation system**

22. FYR Macedonia's National Innovation System (NIS)[19] is underdeveloped and does not support the country's long term plan to become a knowledge based economy. FYR Macedonia's R&D is dominated by the public sector, largely inefficient, and most importantly de-linked from industry needs, particularly those of SMEs. The innovative capacity of the firms, both in terms of human capital and financial resources for R&D and innovation, is low. Brain drain remains a major concern, not only for the private sector, but also for the scientific community. The Intellectual Property Regime (IPR), while adequate in legal terms, lacks adequate institutional support system and most patents registered are of foreign origin. In most cases, the Macedonian research sector and industry do not produce patentable research. The collaboration between innovation actors – public sector, R&D/academia and industry is weak and to a large extent based on informal linkages. Significant improvements are needed in order to meet the Government of FYR Macedonia's (GOM) commitment to facilitate the transition of the country to a knowledge-based economy. The GOM has identified investment in education, science and information technology as top strategic priority areas in its program for the period 2011- 2015 and the Government adopted an Innovation Strategy in October 2012 as the framework for the achievement of these goals.

[19] The National Innovation System (NIS) consists of the policies, laws, regulations, procedures and institutions that affect how knowledge is created, acquired, adopted, disseminated and applied in the economy.

23. The low level of R&D expenditure, particularly in the private sector is one of the key reasons for the low level of innovation. Total R&D expenditures have stagnated compared to GDP growth, falling to almost the lowest in Europe at 0.23% of GDP in 2009 and the portion of private sector expenditure accounts for a dismal 1.3% of total R&D expenditures (BERD was 0.03% of GDP). In 2009, total R&D expenditures in the country were down to 0.19% of GDP whereas the EU average is around 2% (with a majority contribution from the private sector). See Table below for Investment in R&D. Data from the Central Registry shows that in 2004 only 2 small, 21 medium and 31 large enterprises invested in R&D activities, investments amounting to EUR 1.24 million[20]. Moreover FYR Macedonia's R&D expenditure is at a lower level than in several Western Balkan States such as Montenegro, Croatia and Serbia and barely changed from 2003-2008 (see Figure below on R&D). The low levels of public and business spending in research and innovation have been exacerbated by the current difficulties and expensive access to finance for firms, the situation in the Eurozone and the uncertainties in the markets more broadly.

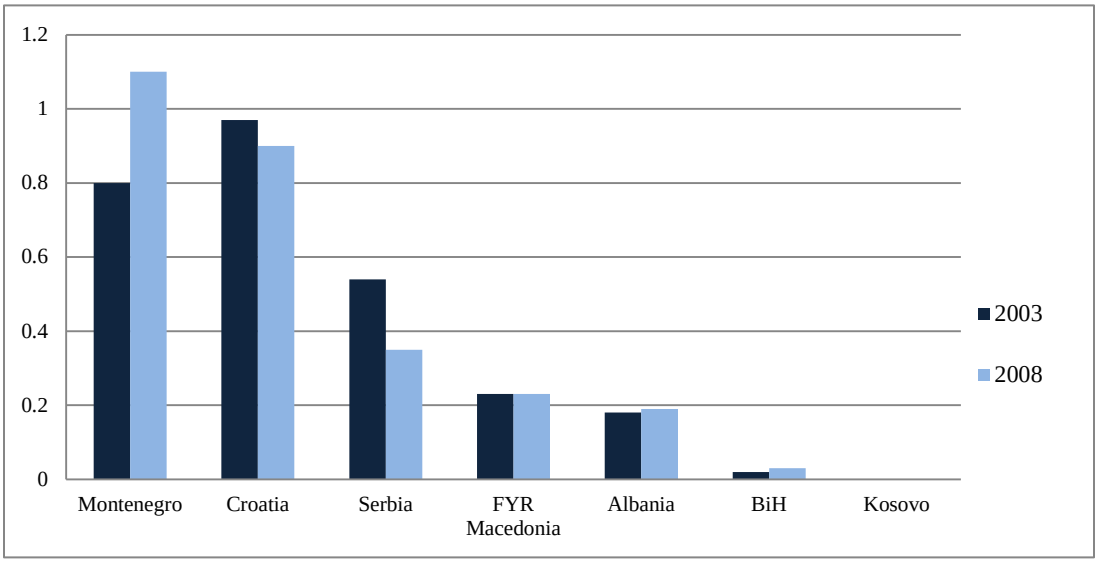
**Table 6: Investment in R&D**

| | 2007 | 2008 | 2009 | 2010 | EU average 2010 |
|---|---|---|---|---|---|
| Real GDP growth rate | 6.1 | 5.0 | -0.9 | 1.8 | 2.0 |
| GERD as % of GDP (R&D intensity) | 0.175 | 0.225 | 0.199 | na | 2.0 [s] |
| GERD per capita | 5.15 | 7.46 | 6.45 | na | 490,2 [s] |
| Total civil R&D appropriations (GBAORD) in million Euro | 5.30 | 6.92 | 6.68 | na | 86,428 [s] |
| Total R&D appropriations in % of GDP (GBAORD as % of GDP) | 0.09 | 0.1 | 0.1 | na | 0.71 [s] |
| BERD in million Euro | 2.4 | 4.3 | 2.8 | na | 151,125.561 [s] |
| BERD as % of GDP (Business sector R&D intensity) | 0.04 | 0.065 | 0.042 | na | 1.23 [s] |
| GERD funded by abroad as % of GERD | 18 | 16.1 | 24.5 | na | 8.4 [1, s] |
| HERD as % of GERD (R&D performed by HEIs as % of GERD) | 29.3 | 31.4 | 32.5 | na | 24.2 [s] |
| GOVERD as % of GERD (R&D performed by PROs as % of GERD) | 47.6 | 40.1 | 46.4 | na | 13.3 [s] |
| BERD as % of GERD (R&D performed by Business sector as % of GERD) | 23.1 | 28.5 | 21.1 | na | 61.5 [s] |

*Source:* Eurostat and ERA-Watch

[20] World Bank, 2013

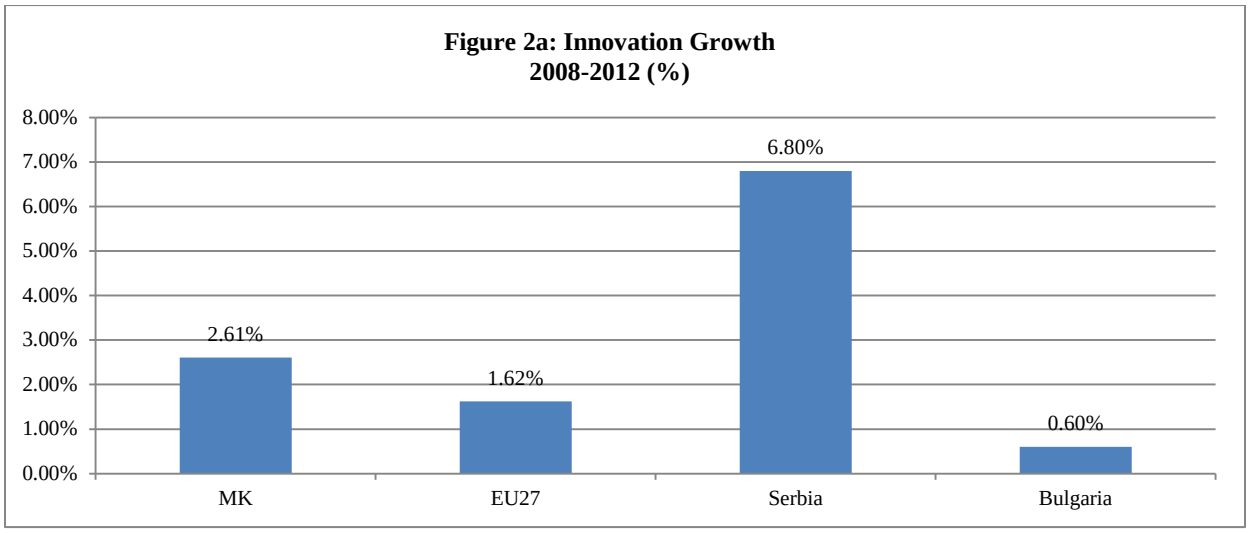
**Figure 1: R&D Intensity in Selected Western Balkan countries, 2003-08 (% of GDP)**

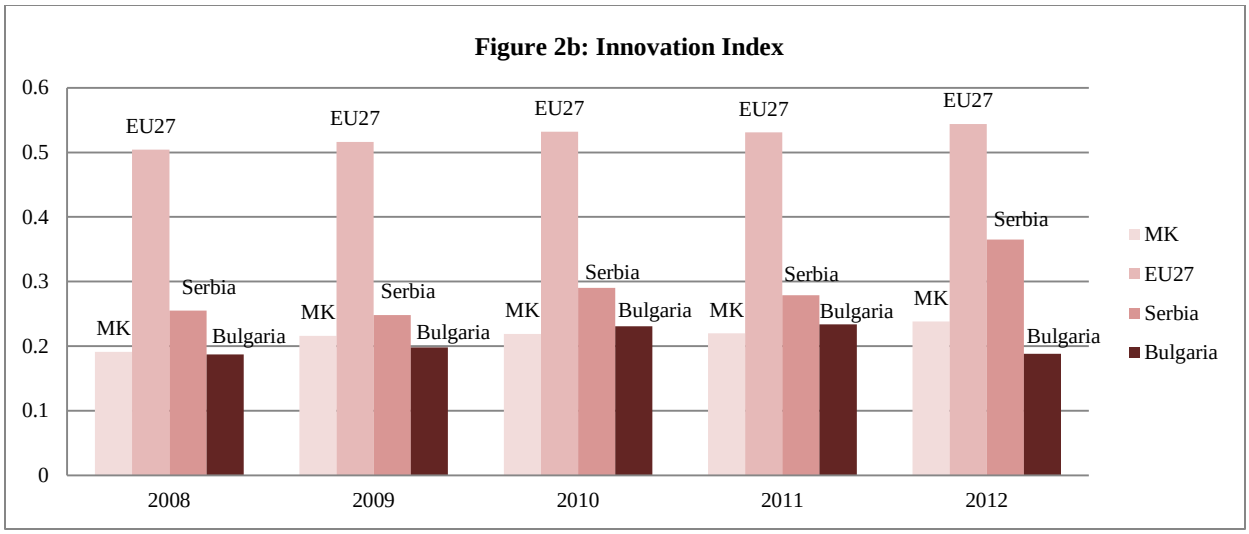



*Source:* Innovation Union Scoreboard-2013, European Commission

24. FYR Macedonia's current innovation performance is subpar, but exhibits areas that could bring promising results. According to the Innovation Union Scoreboard-2013, FYR Macedonia is classified as "modest innovator", revealing a below average performance on most indicators but also exhibiting certain strengths, such as the contribution of medium and high-tech products to the trade balance and innovation performance that is at a rate above that of the EU27, at 2.6% (Figure 2a). If compared regionally, FYR Macedonia's innovation capacity compares favorably to countries like Bulgaria, a fellow modest innovator, while underperforming compared to Serbia, a moderate innovator. The EU27 data is also provided as an illustration of potential growth (Figure 2b).

**Figure 2: Innovation growth and Innovation Index**






*Source*: Innovation Union Scoreboard-2013, European Commission

25. The breakdown of FYR Macedonia's strengths and weaknesses reveals the bottlenecks that continue to stifle future growth**.** The Innovation Index reveals that FYR Macedonia's relative strengths are in Innovator and Economic effects.[21] FYR Macedonia's relative weaknesses are demonstrated by the indicators measuring Finance and Support, Linkages & Entrepreneurship and Intellectual Assets.[22] Given that Finance and Support indicator incorporates sub-indicators of R&D expenditures in the public sector as well as venture capital investments, these findings are not surprising, given the trends of R&D expenditure described above. FYR Macedonia's weak capacity to protect intellectual assets, as measured by the Patent Cooperation Treaty (PCT) patent applications, community trademarks, and community designs, is another important gap in the development of vibrant national innovation system.

26. The innovational mismatch exhibited by FYR Macedonia's innovation system points to opportunities to improve the national innovational capacity. There are a few pockets of excellence in applied R&D (such as the Institute of Earthquake Engineering), university spin-offs and centers of excellence (such as CIRKO at the Faculty of Mechanical Engineering in Skopje, MIR Foundation/SINTEF, the Innovation Center and Innovation Financing Vehicle, all heavily supported by donors) and industry (such as Alkaloid JSC in pharmaceuticals, HiTech Corporation, a PCB manufacturer and others). Alkaloid, for instance, has developed a strong collaboration for R&D and skills training with the Faculty of Pharmacy and Medical Institute at the University of Ss. Cyril and Methodius in Skopje. However, many R&D institutions lack modern R&D infrastructure and are not attuned to the needs of the economy. Their R&D outputs are low both in quantity and quality and they lack a culture of protection and commercialization of their research outputs.

[21] Innovator indicator incorporates data on SMEs introducing product or process innovations, as well as SMEs introducing marketing or organizational innovations. Economic Effects indicator aggregates gains in Employment in knowledge-intensive activities, contribution of MHT products to export trade balance, exports of knowledge-intensive services, sales of new to market and new to firm innovations, and license and patent revenues from abroad.
[22] Finance and Support indicator aggregates data on Linkages & Entrepreneurship and Intellectual Assets.

27. The governance of FYR Macedonia's national innovation system is fragmented and ineffective. As noted by the European Commission (2012) the implementation of innovation policy remains scattered across a number of uncoordinated and poorly funded bodies. While the MOES is in charge of issues such as education, science, technology, research and development (R&D), the Ministry of Economy is responsible for the national strategies for SME development, FDI and industrial policy. Both the MOES and the Ministry of Economy have programs to support innovation projects, while the Agency for Entrepreneurship Promotion deals with innovation vouchers.[23] Additionally, the SME Department and the SME Agency under the Ministry of Economy are considered under-financed as proved by their insufficient program budgets[24] and presence of additional instruments of support available, such as the five Regional Enterprise Support Centers (RESCs), the three Enterprise Support Agencies (ESAs), and the entrepreneurship support agency Prilep Region Enterprise Development Agency (PREDA). Additionally, there are seven active business incubators to support business start-ups.[25]

28. The Government of FYR Macedonia is committed to fostering innovation and technological development with the aim to increase the country's competitiveness and standard of living of its citizens. The commitment has been demonstrated by adoption of an *Innovation Strategy* in October 2012, which was developed with leadership by OECD and in close collaboration between the MOES, the Ministry of Economy and the Cabinet of the Deputy Prime Minister for Economic Affairs. The Strategy aims to strengthen policymaking, coordination and implementation capacity for support to innovation, skills and technological development. In parallel, the MOES developed a *Program for Development of Science and Research for the period 2013-2017* and invested in upgrading R&D laboratory facilities at universities.

29. In order to continue building on this positive momentum, the Government must operationalize the envisioned *Innovation Strategy*. As the next step in the reform process, it is crucial for the Government to strengthen the legal framework on innovation, thus strengthening the intellectual property regime, and set up a Fund for Innovation and Technological Development (FITD) that can provide early stage innovation financing. FITD would facilitate a creation of linkages between research and the market, while at the same time creating a source of R&D funding for development of new ideas, jumpstarting the dynamism of FYR Macedonia's national innovation system.

30. Due to the public-good nature of investment in R&D infrastructure and the high spillover effects and externalities associated with the generation, adaptation, and diffusion of new technologies, the involvement of the public sector in this area is justified. The intangible nature of technological innovation and the uncertainty regarding their results make these types of projects very difficult to finance due to the fact that most banks (public or private) do not accept intangible assets as collateral. Charging high interest rates to compensate for the high proportion of failures leads to adverse selection and moral hazard issues which minimizes demand from lower credit risk clients and increases the need for comprehensive monitoring. Credit markets try to address these issues by resorting to high collateral for granting loans and a preference for

[23] OECD, 2011

[24] European Commission, 2012

[25] These were established with the support of the World Bank in 1997. They include: Incubator Delčevo, the Incubator "Turtel" Štip, the Incubator "Biljana" Prilep, the Incubator Saša, the Deni Incubator Veles, the Giča Incubator Ohrid, and the Inkubator Strumica.

short term lending[26] which is insufficient for innovation projects which are typically long-term in nature. In FYR Macedonia, credit guarantee schemes and a public credit information services have been set up to help companies' access bank loans, but their scope is limited. Thus, this significantly limits the scope and effectiveness of these resources. Similarly, the Macedonian Bank for Development Promotion Credit manages credit guarantee schemes, but only about a third of the loan capital can be covered, which results in a low take up by entrepreneurs. Besides bank finance, innovative companies are in a critical need to have access to equity finance. Therefore investments in innovative activities are typically left to large firms with cash flow reserves, leaving a large part of the industry needs unfulfilled and the level of private investment below the socially optimal level. The social rate of return on R&D expenditures has been estimated to be three times as large as the private rate of return. The role of the public sector therefore is crucial, in its ability to stimulate investments in R&D and play a coordination role in aligning the incentives of all the actors in the national innovation system. Public sector has important role in building a good institutional framework and setting up business environment conducive for technology development.

31. The World Bank has assisted the government of FYR Macedonia in its effort to strengthen the strategic and institutional framework. The 2nd series of the Development Policy Operations is under preparation and should be submitted to Board consideration by the end of 2013. In 2010, the Ministry of Economy, under the auspices of the World Bank funded Business Environment Reform and Institutional Reform Project developed an *Innovation Scoreboard* (evaluating the innovation performance of the country and comparing it to the EU member states). FYR Macedonia is also participating in the preparation of a Western Balkans Regional R&D Strategy that is supported by the EU Instrument for Pre-Accession Assistance (IPA) and the World Bank.

[26]Stiglitz, J. & Weiss, A. (1981). Credit Rationing in Markets with Imperfect Information. *The American Economic Review* , Vol. 71, No. 3 (Jun., 1981), pp. 393-410; Besank, D. & Thakor, A. (1987). Collateral and rationing: Sorting equilibria in monopolistic and competitive credit markets. *International Economic Review* 28, no. 3 (October): 671-89.

## Annex 7: Economic and Financial Analysis

## FYR MACEDONIA: Skills Development and Innovation Support Project

1. The Project would support Government efforts to improve transparency of resource allocation and promote accountability in higher education, enhance the relevance of secondary technical vocational education, and advance the innovative capacity of enterprises and collaboration with research organizations.

2. Both areas, skills and innovation, are important sources of economic growth and also contribute to social inclusion and shared prosperity. For example, the relatively poor economic performance of FYR Macedonia between the mid-1990s and the early 2000s has been linked in particular to its slow growth in total factor productivity (which partly reflects innovation factors) at 1.8 percent per year compared to three percent per year in neighboring countries.[27] There is also significant compelling evidence linking innovation with growth both at the macro and at the firm level.[28] Individuals with higher levels of education have higher productivity (reflected in higher wages as discussed below) and also far better in other aspects of the labor market: the employment rate among those with tertiary education is 70 percent, more than twice as high as that among those with only primary education or less and 20 percentage points higher than among those with only secondary education. This reflects both higher labor force participation—especially among women—and lower unemployment.[29] Better education and skills that lead to better employment outcomes are also important for social cohesion: among the poorest 40 percent of the population, the employment rate is 38.9 percent, 10 percentage points lower than that among the top quintile.[30] Like education and skills, innovation can also pay off in terms of social inclusion and prosperity: More innovative firms are often also those that have higher employment growth.[31]

3. With this in mind, both the Government of FYR Macedonia and the World Bank have put skills and innovation at the center of their strategies for economic and social development in the country. The strategic areas and activities to be supported by the proposed project directly support two of the three key pillars of the *2011-2014 Country Partnership Strategy* (CPS): (i) faster growth by improving competitiveness; and (ii) more inclusive growth by strengthening skills and employability. The proposed Project would also contribute to the country's economic program 2011-2015 where the Government has identified investment in education, science and information technology as top strategic priority areas.

4. **Financial and fiscal impact.** With regards to the financial impact, the project poses no risk to macroeconomic or fiscal stability of FYR Macedonia. In 2012, GDP was EUR 7.5 billion, and its net foreign direct investment was EUR140.1 million. The proposed loan of EUR

[27] World Bank (2009) "FYR Macedonia: Moving to Faster and More Inclusive Growth," Country Economic Memorandum, Report No. 44170-MK, Washington, DC.
[28] World Bank (2013) "Draft R&D Country Note FYR Macedonia for Western Balkans Regional R&D Strategy for Innovation," mimeo.
[29] World Bank (2013) "Employment and Job Creation in FYR Macedonia: Labor Market Assessment 2007-2011." Washington, DC.
[30] Based on HBS (2008), the latest years for which there is reliable information.
[31] World Bank (Forthcoming) "From Jobless Growth to Growing Jobs: Fostering Employment Creation in Eastern Europe and Central Asia."

17.8 million for the Project, disbursed over the course of 5 years, represents 0.2 percent of 2012 GDP and 17.1 percent of net 2012 FDI. This suggests that inflationary and monetary pressures created by the Project would be marginal, if at all. FYR Macedonia has a moderate level of indebtedness (33.8 percent debt to GDP at end-2012) and there is confidence that the Government will be able to fulfill its debt servicing responsibilities.

5. In terms of financial sustainability, the full fiscal impact of the Project is expected to be low, since it would focus on the improvement of the quality and relevance of higher education and vocational education and training and improve the innovative capacity of enterprises and research entities. The purpose of these interventions is to improve the quality of national systems to support skills development and strengthen the structures needed to promote innovation, such as to improve institutional quality and productivity through the provision of incentives and the establishment of national quality norms for all higher education programs and vocational occupational standards. Moreover, the innovation component, with its focus on innovation and R&D support, has the potential to serve as a source of future revenue generation. Therefore, it is expected that these activities can be both sustained and even expanded over the long run, provided that the Government maintains its investment in higher and vocational education in line with its fiscal framework and continues to support its recent policy reforms on innovation (2012) and vocational education and training (2013). Finally, all of the initiatives outlined in the proposed Project support FYR Macedonia's accession into the European Union and there is likely additional funding to come to the country from EU sources as soon as FYR Macedonia begins negotiations for EU accession.

6. In the remainder of this section, we describe the rationale for public intervention, the value added of Bank's support and the economic justification for this operation.

*Technical vocational and tertiary education*

7. **Rationale for public action**. Government intervention and reforms in TVET and tertiary education are needed in order to alleviate some of the market, government and institutional failures that market forces alone or the Government have thus far proven insufficient to address: weak quality standards; imperfect information flows in areas needed for students, governments and institutions to make optimal educational investments; inadequate education financing models; and weak inter-institutional coordination within the education system and between academia and the private sector. Recognizant of these needs, the Government of FYR Macedonia has been active in recent years in improving the quality and relevance of TVET and higher education. The new TVET strategy and legal framework on quality assurance in higher education are to provide the framework for further reform efforts.

8. **Value added of Bank's support**. In support of the Government's activities and plans, the World Bank can add value by continuing to provide technical and financial support to FYR Macedonia. In recent years, the Bank has provided technical assistance on TVET (through the implementation of the SABER[32] Workforce development tool), higher education and employment. This body of analytical work, together with regional studies on skills ("Skills not Just Diplomas") and jobs ("From Jobless Growth to Growing Jobs: Fostering Employment

[32] System Approach for Better Education Results.

Creation in Eastern Europe and Central Asia"), provides the technical basis for the design of this operation. The Bank also brings significant international experience on TVET and higher education projects having already carried out a number of related projects in the region (e.g. Kazakhstan, Montenegro and Russia).

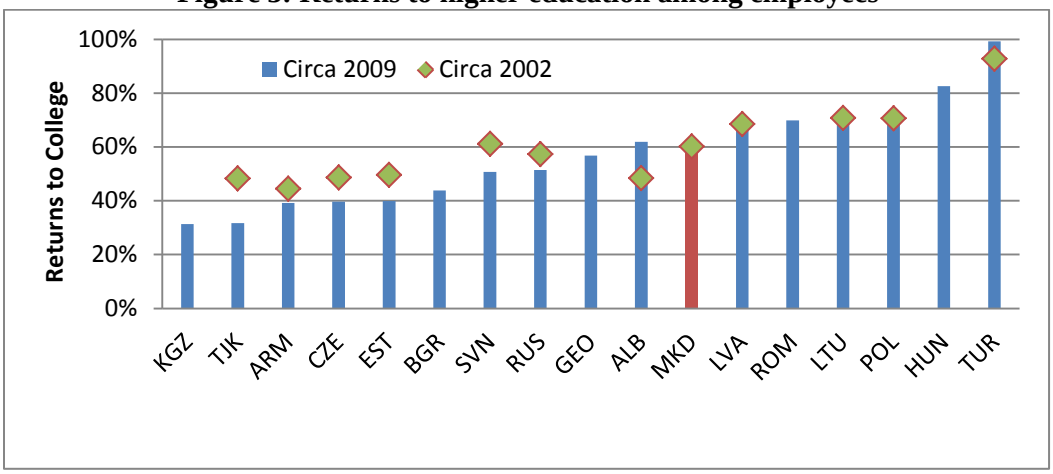
9. **Quality and returns to education**. Project components aimed at improving the quality of TVET and higher education—through reforms to the quality management system or financing reforms— are expected to yield economic benefits by increasing returns to education as "new quality" graduates become more demanded in the labor market, as well as by attracting more people into the system and creating more incentives to complete degrees. Returns to higher education in FYR Macedonia are positive and high by international standards (Figure 3). On average, among employees, having a diploma for higher education comes with hourly wages that are 62 percent higher than earnings associated with a secondary education degree.[33] Returns are particularly high for women (at around 75 percent).[34] That returns have stayed high despite the increase in the number of graduates reflects an increasing demand for skills on the part of firms. In fact, firms in FYR Macedonia are disproportionately likely to report that they have difficulties finding the "right" workers, despite high unemployment (Figure 4). Thirty percent of employers in 1,700 firms surveyed recently in FYR Macedonia argued that hiring a worker is either difficult or very difficult.[35] Improvements in quality of education and the accompanying institutional reforms will also yield other benefits, which may not accrue during the implementation of the period and are more difficult to quantify. Improvements in competitiveness are arguably the most important of these longer term benefits.

[33] Regressions ran for FYR Macedonia only and including also self-employed provide estimates of even higher returns to tertiary education (World Bank, 2013, "Employment and Job Creation in FYR Macedonia: Labor Market Assessment 2007-2011").

[34] Returns to VET education alone are also positive but not statistically significant in similar regressions to those discussed above.

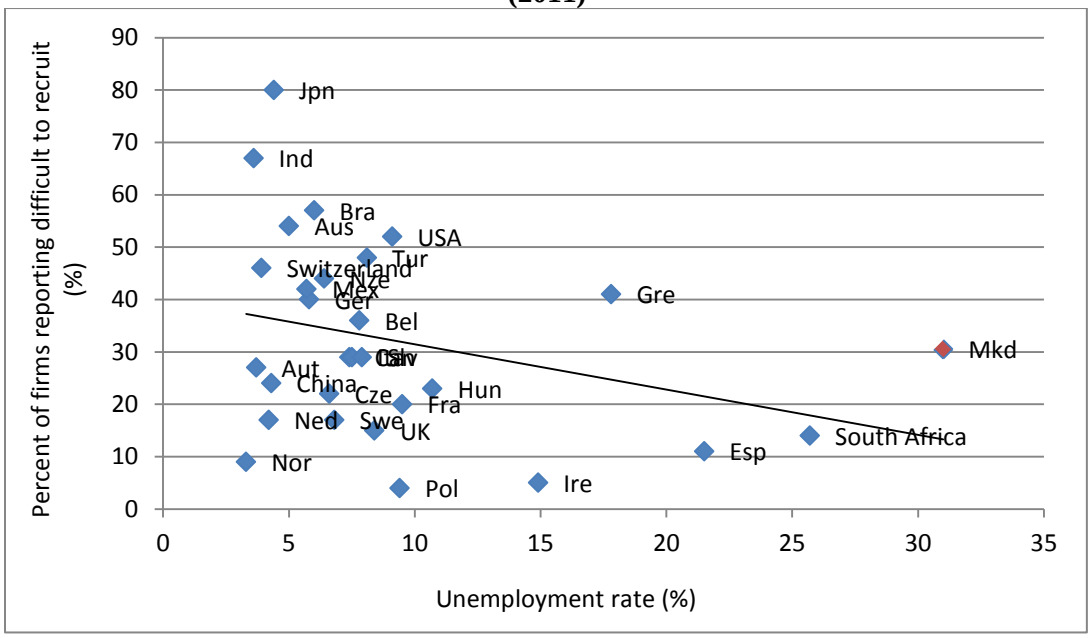
[35] World Bank, "FYR Macedonia Skills Demand Survey", Washington, DC. 2010.

**Figure 3: Returns to higher education among employees**




*Source*: World Bank (Forthcoming) "From Jobless Growth to Growing Jobs: Fostering Employment Creation in Eastern Europe and Central Asia."
*Notes*: The return to tertiary education represents the average percentage earnings differential with respect to secondary education (both general and technical). The dependent variable is the log of hourly wages and the independent variables include dummies for educational attainment, a quadratic on potential experience (or age when the latter is not available, and age-group dummies in Turkey), gender, marital status and a dummy for residence in urban area. These calculations assume that the determinants of the pursuit of tertiary education are unrelated to unobserved determinants of earnings or the expected earnings gain from college and only factor in the indirect costs (e.g. foregone earnings) of a tertiary education.

**Figure 4: Unemployment rates versus percent of firms reporting difficulties recruiting workers (2011)**




*Source*: World Bank analysis, based on OECD (2012) "Better Skills, Better Jobs, Better Lives". For FYR Macedonia: World Bank Skills Demand Survey (2010).

10. **Optimization of the TVET school network.** The projection envisions an optimization of the TVET school network, which would allow for savings that could be re-invested in the system to make necessary investments to improve curricula, teaching, etc. Project supported activities include a study to determine the features and scope of the optimization process, and will be accompanied by an appropriate cost-benefit analysis.

11. **Education and labor market information**. The Project envisages several activities—tracer studies in higher education, a skills observatory—aimed at improving the information available to the education system's stakeholders and better aligning educational choices with labor market needs. By strengthening information systems whose fundamentals are already largely already in place, the additional costs of planned activities are low (e.g. publishing information in an accessible way, outreach activities, working with education centers to collect information in comparable formats). The payoffs of information-related interventions can be large, given its initial costs.[36] OECD countries (including Hungary, Italy, and the Netherlands), and recently Romania, offer examples on how tracer studies can be used to collect and disseminate data on employment and earnings outcomes and how the tertiary sector is performing from a skills perspective. Other countries are establishing labor market observatories (such as currently in Poland and Czech Republic, and outside the region Chile and Colombia), and in cases like the U.K these are integrated with employment services to inform both career choice, training investments and facilitate job search.[37]

12. **Providing more generic skills**. Proposed activities aimed at making skills provided in the education system more transferable can also have positive payoffs in the labor market.[38] The VET and higher education systems emphasize traditional cognitive skills, with-in the case of VET-a focus is on very narrowly-defined occupational profiles and very low vertical and horizontal flexibility.[39] Yet, as Figure 5 shows, the demand of skills has been swiftly moving away from routine, cognitive activities towards "new economy" skills that include non-routine cognitive (e.g. capacity to analyze information critically, problem-solving) and non-cognitive skills (e.g. interpersonal skills, team work, work ethic, grit). Firm surveys in FYR Macedonia also show that firms value at least as much cognitive and non-cognitive skills in the workforce, and that the latter are found to be particularly lacking.[40] Reforms proposed under this Project aim at increasing the transferability of skills, and have, therefore, the potential to better align the skills required in the labor market to those provided and strengthened in the education system.

[36] See Jensen (2010) "The Perceived Return to Education and the Demand for Schooling" (Quarterly Journal of Economics, Volume 125, Issue 2, pp. 515-548) for an example for a rigorous impact evaluation of an information-providing intervention in the Dominican Republic. Using survey data for eighth-grade boys in the Dominican Republic, the authors find that the perceived returns to secondary school are extremely low, despite high measured returns. Students at randomly selected schools that were then given information on the higher measured returns completed on average 0.20–0.35 more years of school over the next four years than those who were not.

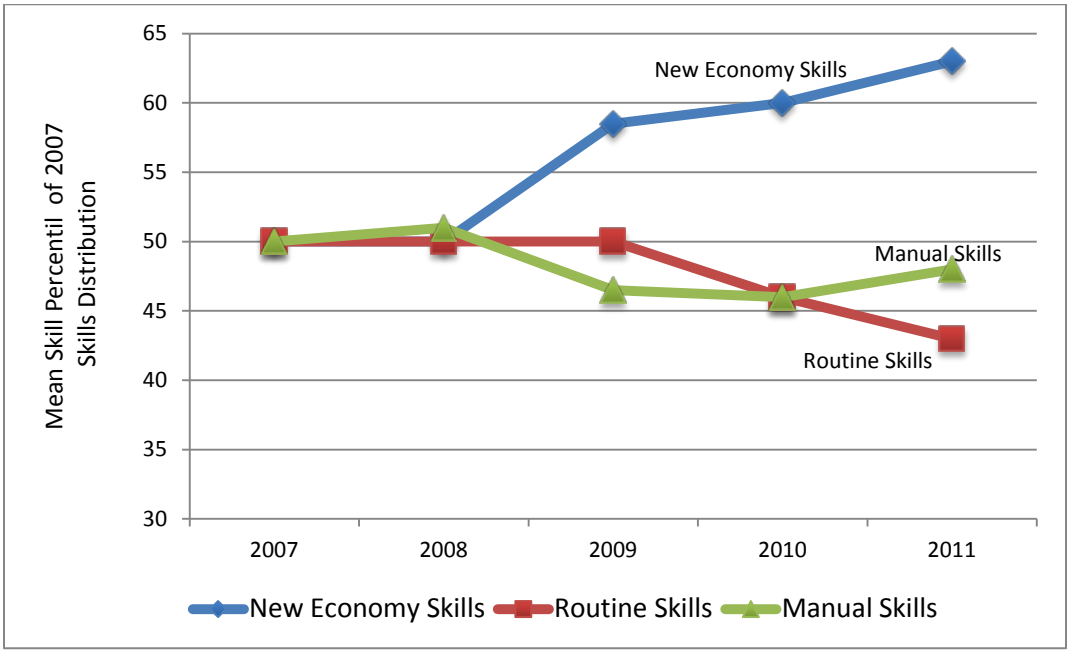
[37] World Bank (Forthcoming) "From Jobless Growth to Growing Jobs: Fostering Employment Creation in Eastern Europe and Central Asia".

[38] Ibid.

[39] FYR Macedonia SABER Workforce Development analysis (forthcoming).

[40] World Bank (2010) "FYR Macedonia Skills Demand Survey", Washington, DC.

**Figure 5: Change in types of skills demanded and firm demand survey, cohort born after 1974**




*Source*: World Bank (Forthcoming) "From Jobless Growth to Growing Jobs: Fostering Employment Creation in Eastern Europe and Central Asia", based on LFS survey.
*Notes*: The y-axis plots the percentile of each skill distribution for each year and cohort with respect to the respective median in the initial year.

*Innovation*

13. **Rationale for public action**. Public interventions and reforms in innovation are needed in order to alleviate existing market, government and institutional failures. In particular, positive cross-firm and cross-sectorial spillovers from innovation can lead too little innovation in the absence of appropriate seed financing from the public sector.[41] In addition, in an environment dominated by small and medium firms, financing interventions may need to be combined with appropriate training and mentoring programs that can widen the net of potential beneficiaries and increase potential returns from participation in innovation-related programs. Within this framework, recent government efforts have focused on laying out the institutional and legal foundations for supporting innovation. The *Innovation Strategy* adopted in October 2012 and the *Program for Development of Science and Research 2011-2015* are part of this process. The Government of FYR Macedonia is also participating in the preparation of a Western Balkans Regional R&D Strategy supported by the EC and World Bank. These efforts have also been complemented by the development of an *Innovation Scoreboard* in collaboration with the Bank. The next steps are to continue strengthening the legal frameworks governing innovation as well as developing financing instruments and institutions to facilitate private sector innovation. These

[41] See, for example, World Bank (2011) "Igniting Innovation: Rethinking the Role of Government in Emerging Europe and Central Asia" (Washington, DC) for a discussion on the relevant literature.

steps will be crucial to stimulate "new ideas" and private sector investment in risky, long-term projects related to innovation.

14. **Value added of Bank's support**. The value-added of the World Bank is both financial and technical. On the financial side, budgetary constraints have been identified as a major impediment to the development of research and innovation in FYR Macedonia.[42] In addition to filling in the financing needs, the proposed Project would also provide needed technical and implementation support, drawing from the Bank's recent Economic and Sector Work and experience in similar projects. Analytically, the innovation component of the proposed Project is based on a series of two competitiveness notes that highlighted the importance of fostering innovation among firms, including small and medium sized, as well as the regional report "Igniting Innovation" which described the international experience and illustrative case studies of the role of the public sector in financing and supporting innovation efforts.

15. **Financing innovation**. Public resources channeled through the FITD are expected to leverage significant private resources to complement innovation efforts. While quantifying the long-term benefits of innovation is difficult, the extent to which public investments generate new private investment in innovation can be a good measure of the economic and financial rationale for the public investment. In the case of innovation funds, these have been shown to leverage significant private resources: In Croatia, where the Bank supported the establishment and functioning of a very similar Innovation Fund ("BICRO"), every Euro spent on the Fund led to 0.71 EUR of private investment.[43] Such values can be used as a reference for potential returns in FYR Macedonia. These returns to innovation spending most likely reflect the role that public spending can play as a catalyzer of private spending in innovation in an environment such as that of FYR Macedonia where initial R&D spending is low[44] and where there are few market and institutions that facilitate and finance the initial fixed-costs of innovation. Evidence from FYR Macedonia shows that in a recent firm survey, 60 percent of respondents cited the high cost of innovation as the most important obstacle for innovation.[45]

16. Private funding for innovation, in turn, can have significant private and social economic returns. The existing literature suggests that the overall return to R&D investment is very large: about 25 percent as a private return and 65 percent for social returns.46 Critically, these returns arise almost exclusively from privately-finance R&D, highlighting the importance of using public funds to co-finance private sector-led innovation and provide early-stage financing rather than financing public-sector led innovation directly.

17. The establishment of the FITD and the development of new financial instruments to support business innovation can be particularly important for SMEs and new entrepreneurs.

[42] FYR Macedonia spends about 0.22 percent of GDP on R&D (compared to 2 percent in the EU). World Bank (2013) "Draft R&D Country Note FYR Macedonia for Western Balkans Regional R&D Strategy for Innovation", mimeo.

[43] World Bank (2013) "Project Appraisal Document on a Proposed Loan in the Amount of EUR20.0 million to the Republic of Croatia for a Second Science and Technology Project", Report No. 70948-HR, April, Washington, DC.

[44] As discussed above, FYR Macedonia spends only 0.22 percent of GDP on R&D activities, most of it by the public sector.

[45] World Bank, "Draft R&D Country Note FYR Macedonia for Western Balkans Regional R&D Strategy for Innovation," mimeo, 2013.

[46] Sveikauskas, L. (2007) "R&D and Productivity Growth: A Review of the Literature," Bureau of Labor Statistics Working Paper 408.

Based on initial discussions with the Government and potential clients, the team anticipates that the Fund and the new financing instruments will benefit mainly SMEs and new entrepreneurs. These young firms have been found to be the engine of job creation across countries: in the Eastern Europe and Central Asia region, for example, about 15 percent of firms—usually, young firms— account for over two-thirds of net job creation.[47] While the FITD and piloted financial instruments would not target specific sectors, the team expects that firms in agribusiness, ICT and light manufacturing may be the largest beneficiaries. These sectors have, in fact, significant potential in terms of direct employment (agriculture and manufacturing represent 48 percent of total employment) and also for productivity.[48] There is also evidence that these tradable sectors, especially when involving high levels of human capital and high-tech industries can have significant spillover effects in terms of employment in the non-tradable sector.[49]

18. Similar interventions in the region, in particular Croatia and Serbia, have uncovered the vast demand for innovation financing. As in Croatia and Serbia, evidence suggests that FYR Macedonia's research and innovation performance is not constrained by lack of ideas, as sometimes argued, but by the availability funding and support services such as accelerators, mentoring, technology transfer offices etc. The existing innovation-funding mechanisms (such as university start-up assistance programs, and other donors' initiatives) often receive more applicants than they can accommodate, exceeding many times the amount of annually available funding. This suggests the existence of a still largely untapped market potential. The lesson is important for the project, since the innovation component plans to foster the supply of funding for the scientific and business communities, while coupling that assistance with support to improve the capacity of innovation-enabling institutions.

19. The establishment of a National Technology Transfer Office (NTTO) could help Macedonian research be effectively commercialized and help the industry with identification and in-licensing of appropriate technology which would lead to technology spillovers in the country. The office would help Macedonia better absorb EU funds as the office would be tasked to coordinating various EU programs. Currently researchers and other stakeholders are unable to take advantage of many programs as dissemination of such information is poor, and prospective beneficiaries lack the support to prepare effective applications. The NTTO, by steering research towards industry, would help tap the latent potential of Macedonian research community.

20. In short, although a full cost-benefit analysis is hard to do given the nature of the project, the Project is expected to have a net positive impact in the economy of FYR Macedonia. Calculating the economic and social rates of return of public investments in human capital and innovation has a number of challenges. Externalities—the rule rather than the exception in the case of investments in human capital and innovation— are difficult to account for; the focus on institutional reforms with long-term benefits add also significant uncertainty to any estimates;

[47] World Bank (Forthcoming) "From Jobless Growth to Growing Jobs: Fostering Employment Creation in Eastern Europe and Central Asia".

[48] World Bank, "Employment and Job Creation in FYR Macedonia: Labor Market Assessment 2007-2011," Washington, DC., 2013; and World Bank, "Unlocking Macedonia's Competitiveness Potential: A Sector Assessment of the Constraints and Opportunities in Automotive, Apparel, Agribusiness, and Logistics Services," Policy Note, Washington, DC, 2012.

[49] Moretti, E. and P. Thulin, "Local Multipliers and Human Capital in the United States and Sweden," *Industrial and Corporate Change*, vol. 22, number 1, pp. 339-362, 2012.

finally, defining monetary values to research outputs, even if commercialized, is also fraught with difficulties. However, the evidence on high returns to education at the individual level in FYR Macedonia, the international evidence on the importance and cost effectiveness of information-providing interventions and the power of similar innovation funds to leverage significant private funds strongly suggest large potential benefits; on the side of costs, beyond the costs of the loan and its servicing, the institutional reforms are expected to have relatively low financial costs.

## Annex 8: Gender

## FYR MACEDONIA: Skills Development and Innovation Support Project

### Gender and Education

1. **FYR Macedonia has achieved gender parity in enrollment rates**, but enrollment rates in tertiary education are lower than the regional average. In 2010, female net enrollment rates slightly outpaced male net enrollment rates, except in the upper secondary level, and were similar to gross enrolment rates. Enrollment rates were also in line with the ECA regional average, except in tertiary education, where only about 42 percent of girls and 35.5 percent of boys are enrolled compared to the regional average rates of 60 percent and 50 percent for girls and boys, respectively.

2. **The gender distribution of the secondary education students** reveals that there is small domination of male students[50] across the secondary education tiers, with the difference most pronounced in specific fields of enrollment. According to the World Bank gender diagnostic assessment completed in 2013, men and women tend also to choose different fields of study. Women are more likely to choose general programs and social science related subjects. Men are more likely instead to choose engineering, production, or construction as a field of study. The most attractive occupational areas for female students in secondary vocational courses are in the economy-law and trade occupational area, with a 1:2 male-female ratio, and the medical one with a ratio of 1:3. Women are also more dominant in the chemical-technological and textile-leather fabrication occupational areas. On the other hand, male students are more numerous in the electro-technical, machine engineering, agricultural-veterinary, traffic and the construction occupational areas.

### Gender and Entrepreneurship[51]

3. **Fewer women decide to start a business than men, but success rates do not differ according to the gender of the entrepreneur**. Analysis based on the 2010 LITS database reveals that 12 percent of women and 19.7 percent of men decided to start-up a firm. Seventy-three percent of men and 74 percent of women who start a business achieve success.

4. **Female-managed businesses appear to be as productive as male-managed businesses whether we measure productivity by looking at the volume of sales or at value added per worker.** The Assessment does not detect any significant statistical differences when looking at size measures or at value added per worker. A survey-weighted regression also confirms these findings.

5. **Few businesses are managed by women, and women managers work mainly in female-owned businesses.** Analysis based on the *World Bank Enterprise Survey* (2009), which looks at established small, medium, and large businesses, shows that 36 percent of the businesses

[50] "State Statistics Office: Situation in 2011," the male – female ratio is 52%:48%

[51] World Bank, *FYR Macedonia: Gender Diagnostic: Gaps in Endowments, Access to Economic Opportunities and Agency*, 2013.

interviewed are owned by women[52] and 18 percent are managed by women. Women manage 10 percent of male-owned businesses and 33 percent of female-owned businesses.

6. **Contrary to other countries, males and females in FYR Macedonia differ little in the sector in which they are engaged, whether we identify male and female businesses based on the gender of the manager or on the gender of the owner.** The majority of male- and female-managed businesses are in the retail sector while a larger percentage of male-managed businesses than female-managed businesses can be found in the sectors of transport, construction, garment, and fabricated metal materials. More female- than male-managed businesses can be found in the sectors of retail, chemicals, food, and plastic and rubber industry. Similar distribution patterns across sectors can be found when disaggregating the data by gender of the owner.

7. **Gender gaps are not observed in the share of males and females who attempted to borrow money to start a business, in the success rates of obtaining a loan, or in the source of financing**.[53] On access to credit, the share of females who attempted to borrow money to start a business is low but similar to that of males (approximately 38 percent of females, compared to 41 percent of males). Among them, 75 percent of females and 71 percent of males obtained the loan. Relatives represent the main source of finance for both genders (47 percent and 48 percent respectively), followed by banks in the case of females (35 percent of females and 26 percent of males) and by friends in the case of males (26 percent of men and 10 percent of women).

[52] The Assessment defines a female-owned business as one in which at least one owner is female. Female-managed businesses are those managed by a woman.
[53] European Bank of Reconstruction and Development, "Life in Transition Survey." EBRD, London. http://www.ebrd.com/pages/research/publications/special/transitionII.shtml. 2010

## Annex 9: Maps

## FYR MACEDONIA: Skills Development and Innovation Support Project

IBRD 33438


THE CITY OF SKOPJE
Skopje serves as the Municipality Capital for each of these Municipalities.
SUTO ORIZARI
BUTEL
GJORCE PETROV
GAZI BABA
CHAIR
SARAJ
KARPOSH
SKOPJE
AERODROM
CENTAR
KISELA VODA
KOSOVO
SERBIA
BULGARIA
GREECE
ALBANIA
This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.
21°E
22°E
23°E
42°N
41°N
To Pristina
To Nis
To Pernik
To Blagoevgrad
To Petrich
To Thessaloniki
To Elbasan
To Korçë
To Kozáni
Pelinci
Staro Nagorichane
Rankovce
Kriva Palanka
Kumanovo
Lipkovo
Chucher-Sandevo
Vratnica
Tearce
Jegunovce
Kratovo
Osogovske Mts.
Makedonska Kamenica
Delčevo
Arachinovo
Ilinden
Probištip
Tetovo
Zheino
Bogovinje
Brvenica
Sopiste
Petrovec
Studenichani
Zelenikovo
Vardar
Sveti Nikole
Kočani
Bregalnica
Vinica
Zrnovci
Obleshevo (Cheshinovo)
Karbinci
Lozovo
Pehcevo
Štip
Veles
Maleševske Mts.
Berovo
Radoviš
Chaska
Vrapchishte
Gostivar
Mt. Korab (2,753 m)
Rostusha (Mavrovo & Rostusha)
Zajas
Oslomej
Debar
Kičevo
Makedonski Brod
Gradsko
Rosoman
Negotino
Konche
Vasilevo
Centar Župa
Drugovo
Vraneshtica
Plasnica
Dolneni
Kavadarci
Demir Kapija
Strumica
Bosilovo
Novo Selo
Crni Drim
Kruševo
Prilep
Krivogashtani
Belchishta (Debarca)
Sopotnica
Valandovo
Star Dojran (Dojran)
Lake Dojran
Vevcani
Demir Hisar
Crna
Bogdanci
Struga
Gevgelija
Ohrid
Resen
Mogila
Novaci
Nidže Mtn.
Lake Ohrid
Bitola
Lake Prespa
Medzitlija
0 10 20 30 Kilometers
0 5 10 15 20 Miles
FORMER YUGOSLAV REPUBLIC OF
MACEDONIA
SELECTED CITIES AND TOWNS
MUNICIPALITY CAPITALS*
NATIONAL CAPITAL
THE CITY OF SKOPJE
RIVERS
MAIN ROADS
RAILROADS
MUNICIPAL BOUNDARIES
INTERNATIONAL BOUNDARIES
*In most cases, the names of the municipalities are identical to their capitals. Where they differ, the municipality is shown in green italic.
FYR MACEDONIA
JULY 2009
IBRD 33438R2