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Implementation of the programme of work since the eighth session of the Committee on Economic Cooperation and Integration: Innovation Performance Review of Tajikistan

Draft Conclusions and Recommendations

Conference room paper submitted by the secretariat

Introduction

The objective of this document is to present the draft conclusions and recommendations from the *Innovation Performance Review of Tajikistan*, which were discussed with the Government and with a group of peer reviewers at the International Conference “Practical steps towards a knowledge-based economy” in Dushanbe 16-17 June 2015, held alongside the seventh session of the Project Working Group on Knowledge-based Development of the Special Programme for the Economies of Central Asia. The *Innovation Performance Review* is a policy oriented document seeking to provide advice to policy-makers and other stakeholders on possible policy actions aimed at stimulating innovation activity in the country, enhancing its innovation capacity and improving the overall efficiency of the national innovation system. The *Review* has been prepared by a team of international and national experts on innovation policy mobilized by the UNECE secretariat in consultation with the national authorities. Recommendations are contained in chapters 2-7 of the *Innovation Performance Review of Tajikistan*.

Policy Priorities

As of 2015, Tajikistan is still in the very early stages of establishing its national innovation system and the range of recommendations for its enhancement is understandably broad. Tajikistan is a lower middle income economy with limited capacity to implement broad-ranging reforms to its innovation system, especially given the demands on policy capacity in other fields. The approach of the review is to focus on issues that are *critical for the functioning of the national innovation system* and which would produce *visible results quickly* without requiring *substantial financial and human resources*.

Tajikistan’s innovation policy agenda is defined by a number of interrelated limiting factors and constraints linked to a substantial lack of skills, knowledge, resources, incentives and opportunities for innovative business development. The most promising policy reforms are those that could relax these constraints at least to some extent. Because of this, the focus of the Review is on policies that would lead to the upgrading of skills, facilitating access to knowledge, making additional resources

available, using existing resources more efficiently, and improving incentives and opportunities in the business sector.

The recommended policy priorities are to:

- (1) Increase investment in education and training, including vocational and on-the-job training, and in academic R&D which is focused on improving absorptive and adaptive capacities. The reforms should be oriented at international quality standards. This may require finance from international donors because the resource requirements will be significant given the young and growing population of the country.
- (2) Facilitate access to foreign knowledge and innovative products, services and solutions that have already been proven to work in foreign markets. This is in general cheaper, faster and less risky than generating knowledge and developing completely new products and services at home. Possible conduits of foreign knowledge are the import of machinery and equipment, knowledge transferred from multinational companies to their Tajikistani subsidiaries through foreign direct investment, the acquisition of the right to use foreign knowledge via licensing agreements, and learning effects achievable through the facilitation of the international mobility of workers, business people, researchers and teachers. All these should be promoted. At the same time, it should be stressed that complementary investments in skills and domestic R&D are necessary in order to enable the Tajik economy to successfully absorb (and adapt to local conditions) any foreign knowledge and innovations.
- (3) Mobilize remittances for domestic investment and attract foreign investment. This is not only a way to attract resources and relax domestic financing constraints, but also to bring in new knowledge. It is particularly important in this regard for policy to facilitate knowledge spillovers from foreign subsidiaries to the domestic economy.
- (4) Reduce bureaucratic obstacles to business activity and improve the general business environment. Regulatory reforms, such as reducing the number of permits required to open a business, to name just one, can often be undertaken at low direct cost to the government budget. They can be undertaken relatively quickly as good practice examples are readily available. Results can be produced quickly and are essential for improving incentives and opportunities for innovation-based investments into the Tajikistani economy. There is also a need to upgrade energy and transportation infrastructure. This will require significant investments, and perhaps assistance, including the support of multilateral financial institutions.
- (5) Streamline, rationalize, and coordinate existing innovation policies in order to reduce waste and improve effectiveness (in terms of budgetary resources and policy implementation capacity).
- (6) Facilitate quality improvements and innovations in business processes, management, and marketing. These may be achieved with relatively little expense and relatively quickly, and can bring significant benefits by improving the prospects of Tajik businesses to penetrate international markets.
- (7) Focus policy support on existing industries, particularly on tradable goods and labor-intensive industries, with a view to support productivity improvements in these sectors which can then form the basis for additional investment and economic diversification into related activities. Moving from agriculture to food processing is one such example.

The following pages present more detailed recommendations with specific action points.

Chapter 2 Policy Recommendations – National Innovation System and innovation Governance

When a country is in the early stages of establishing a NIS, obviously the range of possible recommendations for its enhancement is very broad. The approach of this review is to focus on aspects that are critical for the functioning of the system which could produce visible results quickly and engage limited resources. The recommendations in this chapter have been formulated in line with this underlying rationale.

Recommendation 2.1

The authorities should define the strategic policy orientation of Tajikistan at the level of individual sectors/industries as part of the country's long-term innovation strategy and as the basis for further industrial and innovation policy measures. The following actions could be considered:

- *Undertake a detailed sectoral level assessment of tradable sectors with a view to defining the orientation of industrial policy: export orientation, import substitution, autonomous deepening of the local market or a neutral stance;*
- *Review the National Development Strategy by identifying sectors where proactive policy measures could bring the most significant, immediate and positive effects;*
- *Involve the Consultative Council on the Improvement of the Investment Climate and the State Committee on Investments and State Property Management in this process of coordinating national reform efforts with donor aid and declared investor intentions.*

Recommendation 2.2

The authorities should synchronize policy efforts targeting the modernization of the economy, economic diversification and innovative development under the integrated notion of 'innovation for development'. They could consider to:

- *Undertake an awareness-raising campaign among policymakers and the public at large on the broad understanding of innovation as goods and services that are new to the local market;*
- *Based on that, identify intersections in existing government programmes and take these as a starting point in the design of new programmes in the above areas;*
- *Harmonize policy objectives and instruments across such programmes with a view to achieving synergies and positive spillover effects;*
- *All of the above would be equivalent to the considerable broadening of the front of innovation-related policy efforts with marginal additional effort;*

Recommendation 2.3

The Government should consider measures for improved sharing of responsibilities within the NIS and streamlining innovation governance structures, including to:

- *Increase autonomy to public bodies (ministries, state committees, agencies) in implementing already-approved government policies and programmes; delegate different bodies with adequate power and authority to implement different components of the national innovation-for-development strategy and programmes;*
- *Related to that, the authorities may consider establishing one or several autonomous research and innovation fund(s) which would manage public funds allocated for these purposes; the final funding decisions would be taken at the level of these funds and not be*

subject to censorship at higher levels; the funds would also be responsible for monitoring project implementation;

- *These measures may lead to the need to reorganize the funding of R&D institutions since these would receive reduced amounts of basic funding and be obliged to participate in competitive open calls for more capital (see also recommendation 2.5 and recommendation 5.3 on enterprise science linkages).*

Recommendation 2.4

The Government should consider establishing a programme to complete the institutional buildup of the National Innovation System, specifically targeting innovation infrastructure and support institutions. This programme could include the following actions:

- *Undertake an awareness-raising campaign targeted towards would-be innovative entrepreneurs to help them gain a better understanding of the innovation-for-development process as well as a needs assessment to find out the missing intermediaries that are potentially in highest demand;*
- *Another priority area could be the support of private innovative entrepreneurship at universities; this part of the innovation infrastructure is missing at present but could have a tangible positive effect;*
- *Seek to engage donor support for the establishment of some innovation intermediaries and support institutions.*

Recommendation 2.5

The authorities should adopt targeted measures to improve connectivity and linkages in the NIS through appropriate innovation-for-development policy instruments. They could consider:

- *Gradually introducing grant project funding allocated through competitive open calls as the main policy instrument to support innovation-for-development projects; such funding should cover the complete innovation cycle, and not just parts of it, up to the point of introducing the new product to market;*
- *Improving connectivity and linkages, such funding could be made conditional on the establishment, prior to the project start date, of collaborative linkages among innovation stakeholders, in particular between R&D and industry (see also recommendation 5.3 below);*
- *Complement these measures with non-financial coordination instruments to support connectivity and linkages (facilitating networking and information-sharing among potential stakeholders; organizing forums, exhibitions, fairs, etc. which facilitate inter-firm linkages and linkages between industry and R&D institutions);*
- *The above policy instruments could be effective in pursuing different industrial policy objectives in different sectors (export orientation, import substitution, autonomous deepening of the local market or a neutral stance).*

Chapter 3 Policy Recommendations - Framework conditions, innovation policies and instruments

In the last couple of years, Tajikistan has made some progress regarding innovation activities and specific innovation policies, and particularly its legal framework. However, as the previous section showed, significant challenges remain in the areas of general framework conditions and

entrepreneurial culture, and - despite various approaches, concepts and ideas - in the fact that most existing laws, programmes and innovation support measures have yet to be implemented (poor implementation of legislation). The implementation challenges are related to funding constraints and a lack of strategic capability.

Tajikistan must significantly improve its business environment and make further progress in structural reforms. The EBRD transition macro and sectoral indicators clearly show the sizeable lags which exist in that respect. Large-scale privatisation, the regulatory framework for corporate governance and for enterprise restructuring as well as competition policy are priorities at the macro level. According to the EBRD Transition Report 2014 there are major transition gaps in all corporate sectors (agribusiness, general industry, real estate, ICT), in energy (natural resources, sustainable energy, electric power), in infrastructure (water and wastewater, urban transport, roads, railways,), and in the financial sector (banking, insurance and other financial services, SME finance, capital markets, private equity). So, the policy agenda with respect to structural reforms is huge. But there is by now a clear blueprint of activities where international organisations can provide assistance. However, given limited policy capacities this agenda would need to be selectively prioritized. We strongly suggest that priorities in this respect be linked to those sectors and activities where Tajikistan wants to improve its export competitiveness.

The following recommendations build on the major challenges of Tajikistan but also on promising approaches. Different options on how to do this are possible. Given the limited public budget on the one side and manifold national and societal challenges on the other, priority-setting – both among the different macro policies (e.g. economic and industrial development, science, education, health, social and labor market policy, transport) and the various innovation support measures – will be crucial. It is important to consider a combination of innovation support as an integrated part of (existing) macro policies and as a (new) set-up focusing on innovation and technological development as a self-standing meso-policy. Therefore, the following recommendations should be verified on the basis of these two options. The State Fund for Entrepreneurial Development or a possible programme to support pre-commercial research, for instance, could be further developed or implemented as instruments focusing primarily on innovation. Other instruments, such as the establishment of value chains, support of entrepreneurial activities, education-related improvements, and in particular instruments focusing on specific sectors and the improvement of their economic capability can be embedded in existing macro policies.

Recommendation 3.1

The authorities should advance the process of structural reform and that of improving the business environment in order to create a climate of entrepreneurship and entrepreneurial independence in science and education, business, administration and society as a whole, while providing incentives in the business and science sectors regarding innovation and the foundation of new companies. The following could be considered:

- *Lowering bureaucratic obstacles, reducing over-regulation and harmonizing legislation;*
- *Creating a culture of entrepreneurship, including through the creation of favorable framework conditions for innovation financing (see also the recommendations on entrepreneurship and innovation financing in Chapter 6);*
- *Increasing the skill levels of the labor force (see recommendations 4.2);*
- *Provision of complementary advisory services (e.g. on IPR topics, business plan development, financing, technological development and innovation, marketing and sales, export; see also recommendations 4.4 and 5.5).*
- *Examine options and possible potentials for strengthening the role played by the Chamber of Commerce and the Initiative for SME development.*

Structural reforms generate markets supporting rules and organisations and in that respect are key precondition for any market-based economy. Indeed, they are necessary but not, in our view, a sufficient precondition for growth. As we argued in our report on Ukraine, to increase their impact, regulatory or structural reforms should be inextricably linked to potential areas and sources of growth. In that respect, there is no trade-off between need for technology upgrading and need for regulatory (structural) reforms. Also, we believe that one does not have priority over the other but both should be pursued simultaneously. Potential areas of medium- and long-term growth should be exactly those areas where regulatory reforms are prioritized. Improvements in the business environment at sectoral level are also crucial for the establishment of value chains in strategic industries like agriculture and food-processing, light-industry, chemistry, mining etc.

Recommendation 3.2

Government policy should focus not only on the removal of general obstacles to doing business, but equally on sector-specific obstacles which are most often the major barriers. It would target specific areas with potential such as labour-intensive industries like clothing, or natural resources based like cotton, or new sectors like ICT services. The authorities could consider:

- *Providing information on specific industries and companies (database with company profiles) or through support of joint cooperation activities;*
- *Removing sector-specific regulatory and administrative barriers to company formation, investment, and innovation. An example of a sector-specific regulatory issue would be land ownership in agriculture;*
- *Designing sector-specific investment promotion packages to attract potential investors, including upgrading of sector-specific infrastructure and capabilities. Sectoral regulatory reforms are not sufficient without sector- or industry-specific technology upgrading policy measures.*
- *For example, to stimulate investment and innovation in agriculture, Tajikistan needs to tackle fundamental problems like poor infrastructure, inaccessible markets, poor storage methods, lack of processing facilities, and the relative lack of fertilizer and seeds.*

Recommendation 3.3

In addition to improving the complementary framework conditions for innovation, the challenge of poor implementation of innovation policies should be addressed. Given the size of the country and its funding constraints, a fragmentation of support schemes and respective institutions in charge should be avoided. Innovation support should instead be focused on a few schemes where the knowledge and experience among the implementing (management) authorities is most sophisticated and the leverage effect is expected to be highest. Public authorities could consider the following options:

- *Increase the budget of the State Fund for Entrepreneurial Development on the basis of a solid analysis of its achievements so far - both regarding the results of funded projects and the implemented structures for delivering the services (trainings, seminars, submission procedure, assessment of proposals, actual funding, monitoring of progress, evaluation and impact assessment);*
- *Think about implementing one large, self-standing initiative with the objective of supporting pre-commercial research (single- or multi-firm projects), technological development, innovation and market preparatory activities (integrating up- and downstream tiers);*
- *Strengthen the 'successful' approaches of single institutions like the Academy of Science, the Technical University or the Agrarian University in further improving their respective*

measures and in supporting 'bottom-up' initiatives – which includes a certain degree of financial and organizational autonomy;

- *Implementing legislation on strengthening the establishment of regional innovation systems and transferring competencies to regional authorities; possible options could be the founding of regional innovation supporting agencies having a certain degree of strategic and financial autonomy;*
- *Verifying the public procurement system in general and regarding innovation support in particular; respective measures could include public assignments to new and innovative companies in general; furthermore, assessing innovation impulses within the context of changing standards and norms (regulation).*

Recommendation 3.4

The government should improve the capability and capacity for “strategic intelligence” at all levels of the administration, including the application of strategic instruments like vision-building, scenario techniques, technological foresight and roadmaps, SWOT-analysis. Therefore, the following measures could be considered:

- *Improving the capability at all levels of the national administration regarding the application of strategic instruments and initiating a strategy process on innovation support, including cross-departmental and sectoral cooperation and coordination;*
- *Initiate a consultation process by involving the main representatives of policy, administration, industry, science, civil society and regional authorities or agencies;*
- *Consider including external (independent) knowledge from national or international experts who can take over the role as moderator and enabler of a strategy process and bring in international experience.*

The fact that strengthening policy implementation will inevitably require additional public investments heightens the need to develop accountability and ensure that increased funding is used effectively. This requires establishing evaluation as part of any institutional, legal or financial change. This may seem initially like a waste of resources, but in the long-term this is the only way to improve effectiveness of funding and implementation. This also rationalizes the whole process and reduces lobbying and political tensions which often arise from different superficial and ad hoc interpretations of investment results. Evaluation should be gradually introduced as part of the public management modernization agenda with the help of international organisations and countries.

Recommendation 3.5

With a view to improving the transparency of implemented support and funding schemes, and as an essential instrument to create policies based on evidence and adjust them over time (policy learning), it is necessary to improve data collection, monitoring and evaluation. Related activities could include:

- *Implementing evaluation and monitoring systems within the context of specific funding and support instruments;*
- *Generating and providing innovation-related statistics which fulfill international standards;*
- *Such a system could include the development and application of output and impact indicators, which should be published regularly;*
- *Guaranteeing transparency of public activities and their results;*
- *Carrying out special analyses on particularly important developments regarding innovation and technology (e.g. sectoral studies, impact analyses, and regional analyses).*

Chapter 4 Policy Recommendations - Knowledge transfer, generation and absorption

The key innovation priority for Tajikistan as far as knowledge is concerned is to acquire and use knowledge that already exists, which is less costly and less risky than creating new knowledge.¹ This is production-related knowledge which comes through integration into regional value chains, subcontracting, exporting and FDI. However, less costly and less risky does not mean that existing knowledge can be acquired without cost or that intensive technology effort is not required for its acquisition.

The aim of innovation policy in such a situation is to increase the limited absorptive capacity for innovation, technologies and knowledge in the business sector by improving production capability and mastery of production skills and in this way assisting firms to improve productivity, and to produce and export at world levels of quality.

However, firms are not the only players in this process. A good educational and training system is fundamental for Tajikistan to tap into and absorb knowledge and technologies from abroad, and for creative entrepreneurship.

Tajikistan's unfavourable geographical location leads to high transportation costs. The only way its producers can overcome this disadvantage is by offering a quality sufficient to command prices which can sustain these costs differentials. In addition, being able to offer world quality is today the key precondition for gaining access to global or regional value chains. Most Tajikistani exporters today have difficulty complying with quality standards in terms of product features, health and safety on export markets.

Recommendation 4.1

Tajikistan should take steps to further support improvements in the production capabilities of enterprises, as improvements in production capabilities matter most for innovation and economic growth in low-income and transition economies. Policies to strengthen production capabilities should focus on capabilities to produce to internationally-recognized standards, to differentiate products and services based on higher quality, and to use and adapt technologies and business processes. The authorities could:

- *Create a national awareness-raising campaign and support programme for international quality standards, including training and other forms of assistance for enterprises to acquire ISO certification. While this should eventually become a national programme, these activities could be initiated at first in specific sectors where there is critical mass of awareness that quality is key precondition for exporting. Hence, such sectoral programmes could be initiated in food processing, or in software, or in the textiles or metals sectors, as these seem to be natural candidates for Tajikistan;*
- *Provide additional policy support for the creation and registration of trademarks as a way to create brands that enable companies to realize the increased market value of quality improvements;*
- *Further encourage vocational, on-the-job and life-long training and learning. These are key capabilities which work forces need in order for enterprises to deploy, use and adapt new technologies and processes, and to bring new or better products and services to the market.*

¹ Comin, Diego, and Bart Hobijn. 2004. "Cross-Country Technology Adoption: Making the Theory Face the Facts." *Journal of Monetary Economics* 51 (1): 39–83.

Even though Tajikistan does not compare unfavourably in this area to other transition economies or to low income economies, there is scope for further improvement.

We cannot emphasize enough the importance of high-quality education for Tajikistan. This is important not only because the country has a large and growing young population but particularly because education is a key factor in future economic growth and social prosperity. Being devoid of major natural resources, faced with high export costs and located far from developed markets, Tajikistan has no other options but to invest in its major resource – the skills and education of its people.

Recommendation 4.2

The authorities should increase the quality of education as a strategic modernization project. Evidence suggests that Tajikistan is investing in education at levels comparable to other low-income economies. However, there are also indications that the quality of its education is falling behind. The authorities could:

- *Gradually introduce world standards of quality in teaching. Current initiatives like introducing an agency for quality of education, accreditation of programmes, harmonization with the EU Bologna process, and the introduction of a credit system are steps in the right direction. However, they will produce perverse effects if the quality of teaching itself does not improve.*
- *Modernise and evaluate curricula in order to ensure that the skills of graduates correspond to the needs of the economy. This is a medium-term process which may be carried out in different formats in different subject areas but which should be considered as strategically important for the Government.*
- *Establish a dedicated programme of short and medium-term international training programmes for teachers. Similar to our recommendations for Armenia, we see a strong need for a Tajikistani version of Kazakhstan's Bolashak programme for teachers which should be based on a highly competitive selection process and on promising career opportunities. This might be incorporated into the existing Durakhshandagon programme, and the government could approach the international donor community and propose funding agreements based on cost-sharing.*

One of the main potential conduits for knowledge and technology transfer and diffusion in the Tajikistani economy is foreign direct investment. The key challenges here are to attract foreign investors willing and able to bring new skills and technologies to Tajikistan, and to enable local firms to establish relationships with these foreign investors so that the new skills and technologies are diffused throughout the economy, rather than remaining confined to the foreign subsidiaries.

Recommendation 4.3

The authorities should develop a strategic approach to FDI, taking steps to make the Tajikistani economy more attractive for foreign investors, and to maximize the positive impact of foreign investments in terms of the inflow and diffusion of skills, knowledge and technology (see also recommendation 7.1). In addition to the policies recommended elsewhere in this review for improving the general business and investment climate, the authorities could:

- *Negotiate with major foreign investors arrangements that are based on explicit contracts with their subsidiaries to generate skills that can be useful also for other Tajikistani firms. These should be cost-sharing partnerships with the foreign subsidiaries in order to expand the scale of their training in technical skills beyond their own requirements in order to*

increase the pool of skills available to the industry as a whole. This may seem initially like subsidising multinational corporations (MNCs), but in fact it could be highly effective mechanism to generate skills needed for the economy. MNCs would actually extend the scale of their training programmes beyond what is required to meet their own needs. This would be a good way to speed up the emergence of a local industry which is now a limiting factor of growth;

- *Relatedly, involve local education institutions in these training activities, generating further spillover effects on local vocational training (see also recommendation 5.1);*
- *Create additional and expand existing ‘free economic zones’ to attract export oriented FDI, while providing investors with better quality services and a concentration of skilled labour. Tajikistan has not yet developed basic investment promotion services. Attracting foreign direct investment requires the identification of suitable inward investment prospects and the active servicing of the strategic needs of foreign-invested firms once they are established. In view of this constraint, free economic zones should be promoted on a piecemeal basis in order to accumulate experience, attract investors and learn from other countries’ experiences. In this respect, Tajikistan could benefit from international assistance.*

In Tajikistan the private supply of business services is still in the very early stages. Whether it will be the private or the public sector that will take the lead in providing collective and support services for the innovation needs of firms and other actors in local and regional innovation systems is still not very clear. An innovation-related specialized service infrastructure like basic investment promotion services, technology extension services, standards and metrology, productivity centers, and information and communication services are still very much undeveloped.

Recommendation 4.4

The authorities should create basic business support services linked to an “exports as springboard” agenda. Tajikistan is at the very beginning of building organisations able to directly support innovative projects or that can provide business services that can support innovation. The authorities could:

- *Create business development and support services like export and investment promotion, and country marketing;*
- *Create capacities in metrology, testing, and quality assurance to underpin Tajikistan’s ability to innovate and export, including through the calibration of equipment, quality certification, standards compliance, or energy audits. There is strong latent demand for organisations providing assistance to enterprises in these areas, and the Government should aim to create them on a step-by-step basis;*
- *Create productivity centers which assist firms to improve productivity and quality, including through demonstration centers. They should be initially funded by the government to promote awareness of the need to enhance productivity;*
- *Create technology extension services to generate small but profitable improvements by extending established technology to smaller firms. Technology extension programmes either provide resources that enable firms to identify needs and find appropriate technological solutions or identify and provide solutions through targeted assistance.²*

² While the designs of technology extension organizations differ, all have relations with small firms and with sources of technology. In this respect, Tajikistan could follow successful models of business promotion agencies like Chile’s Technical Cooperation Service, SERCOTEC, a branch of the Chilean Economic Development Agency (CORFO), who is in charge of the promotion of micro and small enterprises. Central to its strategy to assist SMEs are its website and online advice provided at no charge to 30,000 registered firms and its support to CORFO’s mainstream activities. Such agency could partner with other institutions to give expert advice and diffuse information to clients. The system is low

R&D in Tajikistan is at very early stages of development. This can be an advantage as there is scope for its orientation towards those areas and topics for which there is not only manifest but also latent demand in the country.

Recommendation 4.5

The authorities should encourage domestic R&D programmes to focus on adaptations of knowledge and technologies to local demand and market conditions. They could:

- *Increase public R&D as a way to support and complement private R&D;*
- *Focus the majority of public funding of R&D on the adaptation of imported technologies to local conditions (see also recommendation 5.1 and 5.2 on enterprise-science linkages). This orientation towards local relevance of R&D should be built into the R&D funding system through criteria of selection, eligibility and success;*
- *For agriculture, put the focus of R&D on how local conditions in soils, climates, weather, pests, and tastes affect food products;*
- *For industry, put the focus of R&D on adapting to differences in available raw materials and local preferences;*
- *For services, put the focus of R&D on adapting to differences in organization, legal system, cultural norms, and customs;*
- *Beyond this, there can be room in some disciplines for basic research if closely linked to education;*
- *Facilitate the participation of Tajikistani research organizations in international projects on climate change. The percentage of the population which is already affected by droughts, floods, and extreme temperatures is high at 5% compared to 1% in Georgia, 2% in Kyrgyzstan, and 0% in Armenia (WBDI, 2014). Thus demand for local expertise in this area is likely to grow.*

Chapter 5 Policy Recommendations - Economy-Science Linkages in the Innovation Process

Few enterprise-science linkages (ESLs) currently exist in Tajikistan. In the short-term, their economic effects will be limited. However, it is absolutely worthwhile to invest in science and in nurturing ESLs for the long-term future of the country, with a focus on developing lacking technology transfer and commercialization capabilities. Innovation policy is about more than scientific invention and, in setting the policy agenda, involvement of economic ministries and a much wider participation of business actors is crucial. Low demand for innovation is a persistent challenge, because business interest in innovation is a key precondition for active ESLs. Government agencies can facilitate businesses to make these linkages but cannot replace them with orders from ministries. The main target for Tajikistan is to upgrade its technology level and diversify the economic structure. Adaptation-based innovation may facilitate a shift in the import structure from goods to capabilities and, by attracting more foreign investors, there will be an increased transfer of up-to-date technology, marketing methods and organizational techniques. Normative FDI policy should devote more attention to visible and invisible knowledge inflow and

encourage a much broader involvement of local actors from small businesses and education organizations to science organizations.

Recommendation 5.1

Innovation policy should seek to strengthen adaptation-based innovation capabilities by encouraging ESLs, and support the demand for novelty. The authorities should consider:

- *Moving away from isolated ESLs via government actors towards facilitating direct collaboration between industrial/agricultural and science actors;*
- *Investing in education and training capabilities at HEIs for both adaptation- and research-based technology transfer by channelling donor and FDI-related training programmes (see also recommendation 4.5 on knowledge transfer and absorption). University professors should be encouraged to lecture at companies, and discuss topics of mutual interest;*
- *Introducing direct incentives for encouraging business organizations, farms and regional authorities to establish or broaden linkages with science and allocate sufficient financial resources to incentivize business organizations; and*
- *Offering special incentives for FDI to use local science capabilities, either accompanying technology transfer or acquiring inventions (see also recommendation 4.3 and 4.5 above).*

Recommendation 5.2

Since adaptation-based innovation is crucial for the country, innovation policy should devote attention to foreign technology transfer related ESLs as well as commercialization of domestic scientific results. The authorities could consider the following measures:

- *Facilitating the employment by scientific organizations of experienced (foreign) technology transfer managers on a temporary basis to organize on-the-job training, and develop revenue sources to upgrade their physical and personnel capabilities and improve their commercial attractiveness;*
- *Reclassifying technoparks from non-commercial organizations to not-for-profit organizations, thereby strengthening their rights to sell their products; and*
- *Providing specific support to ESLs most likely to lead to successful adaptation, and penetration of foreign technology either through imports or FDI.*

A small country cannot cover all fields of science, and it is important to focus on areas of greatest relevance and advantage. There is a need to strengthen the production of science by reaching the critical mass of financial resources for research in priority fields.

Recommendation 5.3

As part of a medium- to long-term effort to reach internationally accepted scientific performance in areas of economic and social priority, the authorities should consider:

- *A thorough evaluation of Tajikistani scientific performance and capabilities in existing fields (R&D organizations/departments) by international standards, shifting resources away from low priority areas of weak performance;*
- *Based on the above evaluation, continued support for relatively strong fields where a critical mass of intellectual capacity is available or may be achieved within a few years;*
- *Developing new strategies for important fields for the Tajikistani economy, where current physical research infrastructure is outdated but with good intellectual capacities; and*

- *Developing new legal and organizational forms for institutes that need to transform into technology support institutes in either a for-profit or not-for-profit form;*
- *Expanding competitive funding for R&D and making it conditional on the establishment of collaborative linkages between science organizations and industry (see also recommendation 2.5 above).*

Dissemination of scientific results is crucial for enterprise-science linkages. Currently, ministries have some information on academic research findings but business organizations do not generally obtain the relevant information. This makes it difficult for businesses to realize when there is potential for cooperation with science organizations and to identify those organizations which possess relevant competencies.

Recommendation 5.4

In order to improve access for businesses to understandable information on the research capabilities, activities and results of science organizations as a basis for identifying and realizing the potential for enterprise-science cooperation, the authorities should consider the following actions:

- *Relevant ministries can organize a series of workshops where economic and scientific actors discuss relevant topics;*
- *Organization of events to upgrade knowledge of scientific performance and options for their applications targeting policymakers, civil servants, business people, students and the general public;*

Recommendation 5.5

There is a need in the medium to long-term to increase IPR consciousness, and authorities should consider:

- *Increasing IPR awareness among researchers, professors, students and scientific organizations generally;*
- *Specific training efforts for technology transfer managers;*
- *Training support for specialists in intellectual property with special attention to the staff of patent attorneys;*
- *Support for domestic inventors as well as for patenting abroad; and*
- *Developing indicators for the technological balance of payments for Tajikistan, which would be a useful tool for policymakers seeking to diminish the imbalance in licencing, know-how and other invisible trade.*

Chapter 6. Recommendations – Promoting Entrepreneurship and the Financing of Innovative Businesses

The Government rightly considers support measures for entrepreneurship as a priority agenda in Tajikistan. As key enabling factors of innovative entrepreneurship, apart from the quality of the business environment and the institutional quality which directly and indirectly affects this environment, we consider specifically policies and conditions for financing innovative businesses which are shaped by the former two factors.

Recommendation 6.1

The authorities should consider raising awareness of the potential and significance of entrepreneurship and promote a culture of entrepreneurship in society (see also recommendation 3.1 above) by:

- *Introducing entrepreneurship classes as part of the curricula at different education levels;*
- *Running public awareness-raising campaigns on the importance of entrepreneurship for socio-economic development;*
- *Offering capacity-building to actual and would-be entrepreneurs. The offer should be tailored to the sectoral, geographical and organizational specifics of (potential) entrepreneurs. It should include interactive forms of learning which will ensure that the knowledge can be actively applied in practice. The participation of successful entrepreneurs as coaches and mentors should be encouraged;*

Access to finance is one of the critical elements for entrepreneurs and small and medium-sized enterprises to flourish, but also for larger firms to be able to invest in technological upgrading. Under the conditions of innovation for development prevailing in Tajikistan, equity financing is less important than debt financing because the risks involved in absorbing and adapting innovations that are new to the local market but have already been proven elsewhere is lower than the risk of creating innovations that are new to the world. One of the factors limiting the access to debt finance is the ability to secure loans with assets that can be pledged as collateral. Collateral reduces the risk to the lender of incurring a loss in the event that the borrowing firm cannot repay the loan. This in turn reduces the costs of lending and therefore expands the available funding and reduces the rates at which loans can be made available.

Recommendation 6.2

The authorities should consider facilitating the use of existing assets as collateral, following the recent recommendations of OECD, other international organizations and domestic stakeholders by:

- *Enlarging the types of assets that are legally acceptable as collateral; and clarifying collateral and provisioning requirements;*
- *Reforming land ownership legislation and its registry (cadastre) so that real estate can be used more easily as collateral to secure loans;*
- *Creating a fully-functioning registration system for movable assets and making credit information services broadly accessible;*
- *Providing systemic support to innovations in the financial sector, including information technologies.*

Recommendation 6.3

For innovation projects where risks are particularly high, or for projects to be undertaken by new firms which lack credit histories and assets that could be pledged as collateral, additional policy support may be needed for them to secure funding. The authorities could consider:

- *Introducing new instruments to diversify the supply of financial services, such as investment matching (co-financing schemes with private and public funds) and credit guarantee schemes (by outsourcing part of the risk to a third party based on a legal framework for regulating loan guarantee activity);*
- *Expanding programmes for the provision of loans on preferential terms (see also recommendations 2.6 and 3.3 on expanding the programmes of the State Fund for Support to Entrepreneurship);*

- *Making financial support for new entrepreneurs conditional on successful participation in entrepreneurial and financial literacy training and on the presentation of a promising business plan developed during the training.*

Recommendation 6.4

Tajikistan could benefit from designing and gradually putting in place a mass-scale, micro-credit-based entrepreneurship support scheme as an engine to drive development based on innovation and entrepreneurship. Related actions could include:

- *Liaising with international donor organizations to discuss the concept of the scheme (in the context of the whole set of envisaged reform measures) to ensure their commitment to future donor support of operations;*
- *Drawing on the positive lessons from the operation of the Fund for Support to Entrepreneurship, but apply this scheme horizontally to all economic sectors and activities;*
- *The sequencing of implementing the scheme could follow the sectoral priorities as defined in recommendation 2.1;*
- *Entrepreneurship in agriculture as a specific target of this support scheme;*
- *Envisaging, as part of the scheme, options for entrepreneurial support to young people, including the support of University start-ups and/or spin-offs;*
- *Targeting an economy-wide coverage of the scheme, with local outposts catering to local needs; facilitating local entrepreneurs in identifying their local development niches.*

The fact that large numbers of Tajikistani workers have left the country at least temporarily to seek employment abroad can potentially be turned into an advantage beyond the immediate consumption benefits of the sizeable remittances these workers have been sending to their families at home. At present, these remittances seem to be used largely to supplement current consumption expenditures. Current consumption, therefore, remains vulnerable to year-to-year, or even month-to-month fluctuations in the remittances being sent. The recent significant decline in remittances has exposed this vulnerability very clearly. At the same time, Tajiks working abroad may have the opportunity to save some of their income, and to acquire some useful business skills, experience and networks which could potentially be of use to the domestic economy, provided these workers could be persuaded to invest in it.

Recommendation 6.5

In order to encourage Tajiks working abroad to invest in the domestic economy and to use their skills and business contacts to facilitate the access of Tajikistani businesses to foreign markets, the authorities should consider:

- *Creating specific support instruments to target returning migrants with entrepreneurial ambitions (following the recommendations of OECD working group on access to finance and remittances), building on international experience and good practice in this field (e.g. Moldova or Mexico) where entrepreneurship programmes are combined with support to migrant participation in the financial sector; in particular:*
- *Connecting domestic banks and micro-credit institutions to international money transfer organizations abroad in order to facilitate the transfer of remittances into savings/investment accounts in the domestic financial industry, and encouraging the industry to develop accounts that link different savings and investment products;*
- *Matching investments by migrants into entrepreneurial activities with an equivalent subsidy by public and donor funds;*

- *Consider privileges for applicants for micro-credit who attract matching funding originating from remittances.*

Chapter 7. Recommendations – Innovation and International Economic Integration

Despite its challenging geographic location, Tajikistan has managed to develop and maintain growing economic, political and cultural relations with a number of partner countries including China and Russia, as well as Afghanistan, Iran, Kyrgyzstan, Uzbekistan, Kazakhstan and Belarus. These relations provide opportunities for knowledge exchange and innovation. But more can be done to expand these opportunities and strengthen relations with additional partners.

Recommendation 7.1

The Tajikistani Government should continue to strengthen the linkages between all elements of its national innovation system and foreign partners in order to facilitate the transfer of knowledge and technology and improve market access for innovative products by Tajikistani firms. These measures could include:

- *Simplifying further existing bureaucratic requirements and procedures regulating inward foreign direct investment, offering additional incentives, and decreasing tax rates (see also recommendation 4.3);*
- *Developing a comprehensive internationalization strategy for innovation, research and education. This strategy would need to be aligned with any existing policies in this field, in addition to including a vision, clear priorities and goals;*
- *Continuing to proactively learn about the best practice from counterparts in partner countries. They should further develop (where possible) new regional and international cooperation initiatives in the area of innovation and research;*
- *Creating new opportunities for its enterprises and researchers by working together with authorities from other countries on the development and creation of cross-border value chains.*

Tajikistani scientists and researchers are somewhat active when it comes to cooperation activities involving counterparts from its traditional partners such as Russia, other ex-Soviet republics and some of Tajikistan's neighboring countries. However, its universities and research centers are less well connected to scientific excellence centers located elsewhere. As Tajikistani universities have not yet made it into the main international university rankings, further work must be carried out before they are able to improve their international standing.

Recommendation 7.2

Policymakers in Tajikistan should consider introducing additional measures that could increase the current low rate of participation amongst Tajikistani researchers in cross-border and international cooperation programmes (and publications) in research and innovation by:

- *Creating incentives for its research institutes and universities to enter new and existing S&T alliances with strategic international partners;*
- *Regularly reviewing the roles and focus of dedicated divisions (otdel) responsible for the international relationships of research organizations;*
- *Supporting researcher involvement in international conferences, exchanges and training seminars;*
- *Promoting staff cooperation with international peers on co-authored publications;*

- *Working towards making Tajikistani universities and research centers attractive for international visiting fellows;*
- *Organizing academic conferences and similar events in Tajikistan;*
- *Proactively inviting international and Tajikistani scientists and researchers working abroad to take part in relevant research events and activities in Tajikistan.*

Recommendation 7.3

The authorities should further strengthen their efforts promoting the mobility of researchers, scientific staff and students by:

- *Strengthening the Durakhshandagon programme of international presidential scholarships by inter alia further clarifying its rules and systematically assessing its results with a view to identifying scope for improvement (see also recommendation 4.2);*
- *Working towards making the Tajikistani education system compatible with those in European countries (see also recommendation 4.3). Develop, modernize and disseminate new curricula and internationally-compatible teaching methods or materials.*
- *Supporting educational modules in English and other foreign languages.*

Recommendation 7.4

While the Academy of Sciences keeps some information on its website regarding many cooperation agreements, the information is not shared in a way promoting such activities. A further development of (informal and formal) information-sharing channels could enable the use of opportunities in international funding programmes.

- *This could include a database with information regarding previous, upcoming and regular Open Calls launched by international funding bodies.*
- *A network of existing internationalization officers could be created and connected to similar bodies/associations in partner countries.*
- *Create a support network consisting of researchers or entrepreneurs with experience of applying for competitive funding or participation in international research and scientific projects;*

Recommendation 7.5

Support research and scientific staff (as well as PhD students) to prepare grant and other competitive funding applications, and draft proposals, amongst others, aimed at international funding sources. This might involve:

- *Train the trainers: a national level contact person (or a Tajikistani researcher with international experience) could coach representatives of various internationalization departments at Tajikistani universities, who in turn would train academic staff members.*
 - *Offer training in a number of relevant areas such as academic writing in English, international funding opportunities, etc.*
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