

UNECE

Innovation Performance Review



TAJKISTAN



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United Nations Economic Commission for Europe

**INNOVATION
PERFORMANCE REVIEW
OF TAJIKISTAN**



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NOTE

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FOREWORD

Innovation has never been higher on the economic policy agenda, and features prominently in the United Nations 2030 Agenda for Sustainable Development. The Republic of Tajikistan has achieved strong economic and social development over recent years, and has made important steps in moving away from a factor-driven to an efficiency-driven model of growth. Innovation will be crucial to moving towards the next level of economic prosperity, and the right policy measures will play a decisive role.

The *Innovation Performance Review of Tajikistan* continues the series of national assessments of innovation policies, which includes earlier Reviews of Belarus, Kazakhstan, Ukraine and Armenia. This policy advisory work draws on the experience accumulated by the UNECE in the identification of good practices and policy lessons in the area of knowledge-based development, in particular concerning the special circumstances of countries with economies in transition.

This *Review* presents the outcomes of an advisory project undertaken at the request of the Government of the Republic of Tajikistan. It provides a set of recommendations and options to encourage innovation and enhance the effectiveness of public policies. Close collaboration with the national authorities and other experts from Tajikistan throughout the project has ensured that the final assessment reflects a common understanding of the situation in the country and the validity of the proposed recommendations.

Innovation is a complex process that involves multiple actors. The UNECE *Reviews* take a comprehensive approach that looks critically at the different components of the national innovation system, their mutual relations and the overall economic, institutional and policy context in which innovation activities take place. This distinctive approach provides a solid foundation upon which areas can be identified where policy interventions could be most beneficial by removing bottlenecks and develop existing potential.

I would like to thank the Government of the Republic of Tajikistan for its support in the implementation of this joint project. I hope that the recommendations of this *Review* will be useful to policymakers in their efforts to promote innovation.



Christian Friis Bach
Executive Secretary

United Nations Economic Commission for Europe

PREFACE

The practical work on the *Innovation Performance Review of Tajikistan* began in November 2014 with a preparatory mission by representatives of the UNECE secretariat to establish contact and discuss the structure and content of the *Review* with the national authorities and other stakeholders. The main project mission took place from 28 February to 6 March 2015 with the participation of a team, which included representatives of the UNECE secretariat, international and national experts.

This *Review* reflects the outcome of a series of consultations and discussions between the *Review* team and policymakers, government officials, representatives of academic institutions and the business community and other innovation stakeholders of Tajikistan.

The draft text of the *Review* was submitted for comments to the authorities of Tajikistan and to a group of independent international experts who had not participated in the field mission. The main outcomes of the project, including its main conclusions and recommendations, were presented and discussed during an International Conference “Practical steps towards a knowledge-based economy” held in Dushanbe from 16 to 17 June 2015 within the activities of the Project Working Group on Knowledge-based Development of the United Nations Special Programme for the Economies of Central Asia (SPECA). Participants included the members of the *Review* team, external reviewers and high-level representatives of the Government of the Republic of Tajikistan, as well as delegates from other SPECA countries and United Nations member States.

The final text of the *Review* was prepared for publication by the UNECE secretariat reflecting the outcome of these discussions as well as other comments and suggestions by different stakeholders.

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The Innovation Performance Review of Tajikistan was prepared by a group of international and national experts as well as by staff of the UNECE secretariat. The Review was the result of a collective effort in which the lead authors for each chapter were: Mr. Christopher Athey and Mr. Ralph Heinrich (Chapter 1), Mr. Rumen Dobrinsky (Chapter 2), Mr. Thomas Stahlecker (Chapter 3), Mr. Slavo Radosevic (Chapter 4), Ms. Annamaria Inzelt (Chapter 5), Ms. Anna Kaderabkova (Chapter 6) and Mr. Ruslan Rakhmatullin (Chapter 7). Mr. Lars-Gunnar Larsson, Ms. Anna Pobol and Mr. Bart Verspagen reviewed the first draft of the Review and provided relevant suggestions. Mr. Bahodur Mengliev prepared a background document and provided inputs and comments to this Review.

During the discussions at the International Conference, “Practical steps towards a knowledge-based economy,” in Dushanbe in June 2015, Mr. Shavkat Bobozoda, Mr. Umed Davlatzod and Mr. Akram Ruzizoda presented comments and suggestions on behalf of the delegation of Tajikistan. The efforts of Mr. Parviz Dzhaborov, Mr. Sultan Umarov and Mr. Tavkal Malikov in support of this project were also greatly appreciated. Mr. Christopher Athey, Mr. Ralph Heinrich and Ms. June White contributed to the overall editing of the publication, with Ms. Andrea Hegedus providing technical assistance. Ms. Mihaela Cerbari and Mr. Oleg Nikolaiko provided valuable research assistance to this project.

The smooth work throughout the project was greatly facilitated by the helpful support and cooperation of the Ministry of Industry and New Technologies of the Republic of Tajikistan, which was the lead partner of UNECE in Tajikistan in implementing this project.

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ABBREVIATIONS

ADB	Asian Development Bank
AoS	Academy of Sciences of the Republic of Tajikistan
BEEPS	Business Environment and Enterprise Performance Survey
BMZ	German Federal Ministry for Economic Cooperation and Development
BOMCA	Border Management in Central Asia
CADAP	Central Asia Drug Action Programme
CAREC	Central Asia Regional Economic Co-operation
CASA 1000	Electricity transmission project connecting Tajikistan, Kyrgyzstan, Afghanistan and Pakistan
CC	Consultative Council
CCIIC	Consultative Council on the Improvement of Investment Climate
CEE	Central and Eastern Europe
CIS	Commonwealth of Independent States
CORFO	Chilean Economic Development Agency
CPS (WB)	Country Partnership Strategy (World Bank)
CSTO	Collective Security Treaty Organization
DIP-ECHO	Disaster Preparedness Programme – European Commission for Humanitarian Aid and Civil Protection
DFID	Department for International Development (UK)
EAEU	Eurasian Economic Union
EAPO	Eurasian Patent Organization
EBRD	European Bank for Reconstruction and Development
EECA	Eastern Europe and Central Asia
EHEA	European Higher Education Area
EIDHR	European Instrument for Democracy and Human Rights
ESL	Economy-Science Linkage
ESRC	Economic and Social Research Council (UK)
FP	European Union Framework Programme
FDI	Foreign Direct Investment
GCI	Global Competitiveness Index (World Economic Forum)
GCR	Global Competitiveness Report (World Economic Forum)
GDP	Gross Domestic Product
GEF	Global Environment Fund
GERD	Gross Expenditures on Research and Development
GIZ	Gesellschaft für Internationale Zusammenarbeit (Germany), incl. former GTZ
GMO	Genetically Modified Organism
GNI	Gross National Income
GPF	Governance Partnership Facility
GSP	Generalized System of Preferences
HEI	Higher Education Institution
ICT	Information and Communication Technologies
IDF	Institutional Development Fund – World Bank Group
IFC	International Finance Corporation – World Bank Group
IMF	International Monetary Fund
IP	Intellectual Property
IPA	Institute of Public Administration
IPR	Intellectual Property Rights

ISL	Industry-Science Linkages
ISO	International Organization for Standardization
IUS	Institute for Statistics, UNESCO
LAEBA	Latin America/Caribbean and Asia/Pacific Economics and Business Association
LHE	Law on Higher Education
LMI	Lower-middle-income (countries)
LPI	Logistics Performance Index
MES	Ministry of Education and Science (Tajikistan)
MEDT	Ministry of Economic Development and Trade (Tajikistan)
MFI	Micro Finance Institution
MFN	Most Favoured Nation
MINT	Ministry of Industry and New Technologies (Tajikistan)
MNC	Multinational Corporation
MSME	Micro, Small and Medium-sized Enterprise
NBFI	Non-Bank Financial Institutions
NBT	National Bank of Tajikistan
NCPI	National Centre for Patents and Information
NDS	National Development Strategy
NIP	National Information Point
NIS	National Innovation System
NPL	Non-Performing Loan
NSDIP	National Strategy for the Development of Intellectual Property
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OSCE	Organization for Security and Co-operation in Europe
PCT	Patent Cooperation Treaty
PFM	Public Financial Management
PPD	Public-Private Dialogue
R&D	Research and Development
RIA	Regulatory Impact Assessment
SCISPM	State Committee for Investment and State Property Management
SCO	Shanghai Cooperation Organisation
SHP	Small Hydro-Power
S&T	Science and Technology
SECO	State Secretariat for Economic Affairs, Switzerland
SERCOTEC	Technical Co-operation Service, Chile
SIID	Strategy of Industrial Innovative Development
SME	Small or Medium-sized Enterprise
SODESCO	Society for Development of Scientific Cooperation
STI	Science, Technology and Innovation
SWOT	Strengths, Weaknesses, Opportunities, Threats
TACIS	Technical Aid to the Commonwealth of Independent States
TajStat	Agency on Statistics under the President of the Republic of Tajikistan
TARP	Tax Administration Reform Project
TEMPUS	EU programme for modernisation of higher education
TJS	Tajikistani Somoni
TRIPS	Trade-related Intellectual Property Rights
TUT	Technological University of Tajikistan

UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WBDI	World Bank Development Indicators
WBG	World Bank Group
WDI	World Development Indicators
WEF	World Economic Forum
WIPO	World Intellectual Property Organization
WTO	World Trade Organization
ZEF	Centre for Development Research (University of Bonn, Germany)

EXECUTIVE SUMMARY

The *Innovation Performance Review of Tajikistan* provides an independent evaluation of the national innovation system (NIS), the institutional framework of innovation policy and the various mechanisms and instruments of public support for innovation. On the basis of this broad assessment, policy options and recommendations are offered to improve the innovation performance of the country and enhance the innovation capacities of stakeholders.

High-level messages

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. In 2014, Tajikistan moved from being a low income to a lower-middle-income economy according to the World Bank classification. This transition represents significant progress, particularly in private sector development, but capacity to implement broad-ranging reforms to Tajikistan's innovation system remains limited, especially given the demands on policy capacity in other fields. The approach of this 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. As a result, the focus of this Review is on policies that would lead to the upgrading of skills, facilitating access to knowledge, making additional resources available, more efficient use of existing resources, and improving incentives and opportunities in the business sector.

The recommended policy priorities aim to allow policymakers in Tajikistan 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. These reforms should be aligned with and support the implementation of international quality standards. This may require financing 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. In general this approach is 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 the learning effects which can be achieved by facilitating the international mobility of workers, business people, researchers and teachers. All these approaches 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 Tajikistani economy to

successfully absorb (and adapt to local conditions) 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. In this regard, it is particularly important 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 a low direct cost to the government. Such changes can be implemented relatively quickly as good practice examples are readily available. In addition, 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 investment 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 improvements and innovations in business processes, management, and marketing that support greater quality in products and services. These may be achieved with relatively little expense and relatively quickly, and can bring significant benefits by improving the prospects of Tajikistani businesses to penetrate international markets.
- (7) Focus policy support on existing industries, particularly on tradable goods and labour-intensive industries, with a view to supporting 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.

Assessment and recommendations

National innovation system and innovation governance

When a country is in the early stages of establishing a national innovation system (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, could produce visible results quickly, and engage limited resources. The recommendations have been formulated in line with this underlying rationale.

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. This could be informed by undertaking 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. The National Development Strategy can play an important role by identifying sectors where proactive policy measures could bring the most significant, immediate and positive effects. The Consultative Council on the Improvement of the Investment Climate and the State Committee on Investments and State Property

Management should be involved in the process of coordinating national reform efforts with donor aid and declared investor intentions.

Policy efforts should be synchronized in order to target the modernization of the economy, economic diversification and innovative development under the integrated notion of “innovation for development”. This could include undertaking an awareness-raising campaign among policymakers and the public at large on the broad understanding of innovation as being goods and services that are new to the local market. Such policy synchronization could help identify areas of interaction between existing government programmes and take these as a starting point in the design of new programmes. Policy objectives and instruments could be harmonized across such overlapping areas of programmes with a view to achieving synergies and positive spillover effects. This could considerably broaden the front of innovation-related policy efforts with marginal additional effort.

The Government should consider **measures to improve the sharing of responsibilities** within the NIS and to streamline innovation governance structures. This would include increasing the autonomy of public bodies (ministries, state committees, agencies) in implementing already-approved government policies and programmes, and delegating to the relevant bodies adequate power and authority to implement different components of the national innovation-for-development strategy and programmes. The authorities may also consider establishing one or several autonomous research and innovation fund(s) which would manage public funds allocated for these purposes. Final funding decisions would be taken at the level of these funds, based on defined competitive processes and not be subject to approval at higher levels (although subject to audits to ensure the correct functioning of the competitive processes). These funds would also be responsible for monitoring project implementation. Such measures may lead to the need to reorganize the funding of R&D institutions since these would receive reduced amounts of basic funding and would be obliged to participate in competitive open calls for more capital.

The Government should consider establishing a programme to complete the **institutional build-up of the National Innovation System**, specifically targeting innovation infrastructure and support institutions. This could include undertaking 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 identify the missing intermediaries that are potentially in highest demand. Another priority area could be support for private innovative entrepreneurship programmes at universities, which is a part of the innovation infrastructure that is missing at present and could have a tangible positive effect. The Government should also seek to engage donor support for the establishment of some innovation intermediaries and support institutions.

The authorities should adopt targeted measures to **improve connectivity and linkages in the NIS** through appropriate innovation-for-development policy instruments. These could include gradually introducing grant project funding allocated through competitive open calls for tender as the main policy instrument to support innovation-for-development projects. Such grant-based funding should cover the complete innovation cycle, and not just parts of it, up to the point of introducing the new product to market. To improve connectivity and linkages, this 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. These measures should be complemented 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, etc.).

The above policy instruments could be effective in pursuing various industrial policy objectives across sectors (export orientation, import substitution, autonomous deepening of the local market or a neutral stance).

Framework conditions, innovation policies and instruments

In recent years, Tajikistan has made some progress regarding innovation activities, specific innovation policies and, particularly, its legal framework. However, 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 other 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. Large-scale privatization, the regulatory framework for corporate governance and enterprise restructuring, as well as competition policy, are priorities at the macro level. There are major development 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). While the policy agenda with respect to structural reforms is huge, there is now a clear blueprint of activities where international organizations can provide assistance. There is also a clear coordinating mechanism in the form of the Development Coordination Council, comprising international donors and donor organizations that are active in Tajikistan. However, given limited policy capacities, this agenda needs to be prioritized. We strongly suggest that priorities set for improving the business environment be linked to those sectors and activities where Tajikistan wants to improve its export competitiveness.

Given a limited public budget on 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 labour market policy, transport), and the various innovation support measures – will be crucial. It is important to consider a combining two approaches: one where innovation support is an integrated part of (existing) macro policies, and the other where it is treated as a new area, focusing on innovation and technological development as a self-standing meso-policy. 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 innovation-support 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.

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 to the business and science sectors to support innovation and the foundation of new companies. This could include lowering bureaucratic obstacles, reducing over-regulation and harmonizing legislation. There should be efforts to create a culture of entrepreneurship, including favourable framework conditions for innovation financing, while increasing the skills level of the labour force. Provision of complementary advisory services is also important, for example on IPR topics, business plan development, financing, technological development and innovation, marketing and sales, and export. Options for strengthening the role played by the Chamber of Commerce and Industry and the Initiative for SME development should be explored.

Structural reforms generate market-supporting rules and organizations and, for that reason, are key preconditions for any market-based economy. Indeed, they are a necessary but not, in our view, a sufficient precondition for growth. As we argued in our review of Ukraine, to increase their impact, regulatory or structural reforms should be very closely linked to potential areas and sources of growth. In that respect, there is no trade-off between the need for technology upgrading and the need for regulatory (structural) reforms. One does not have priority over the other - 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 a sectoral level are also crucial for the establishment of value chains in strategic industries like agriculture and food processing, light-industry, chemistry, mining etc.

Government policy should focus not only on the removal of general obstacles to doing business, but equally on sector-specific obstacles which are very often the major barriers. Policy should **target specific areas with potential**, such as labour-intensive industries like clothing, natural resource-based industries such as those using cotton, or new sectors like ICT services. Information should be provided on specific industries and companies (e.g. databases with company profiles) or through the support of public-private cooperation activities. Sector-specific regulatory and administrative barriers to company formation, investment, and innovation should be removed. An example of a sector-specific regulatory issue would be land ownership in agriculture. Sector-specific investment promotion packages should be designed to attract potential investors, including the upgrading of sector-specific infrastructure and capabilities. Sectoral regulatory reforms are not sufficient without policy measures to upgrade sector- or industry-specific technology and infrastructure. 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.

In addition to improving the complementary framework conditions for innovation, the challenge of **poor implementation of existing innovation policies should be addressed**. Given the size of the country and its funding constraints, a fragmentation of support schemes and a multiplication of respective, responsible institutions should be avoided. Innovation support should instead be focused on only a few support schemes where the knowledge and experience among the implementing (management) authorities is most sophisticated and the leverage effect is expected to be highest. Possible options could include increasing 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 (training workshops, seminars, submission procedures,

assessment of proposals, actual funding, monitoring of progress, evaluation and impact assessment). Consideration should also be given to 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 activities). “Successful” approaches of individual institutions like the Academy of Science, the Technical University and the Agrarian University should be supported to help them further improve their respective measures and “bottom-up” initiatives. In order to foster creative approaches, implementing institutions should also be given a certain degree of financial and organizational autonomy. Legislation should be implemented to strengthen the establishment of regional innovation systems and the competency for managing these systems transferred to regional authorities; for example, one possibility would be the founding of regional innovation support agencies with a certain degree of strategic and financial autonomy. There is a need to audit and ensure the transparent functioning in general of the public procurement system according to recognized international principles and, in particular, with regard to innovation support. Possible measures could include public procurement from new and innovative companies in general, and to assess innovation impulses within the context of changing standards and norms (regulation).

The Government should improve its capability and capacity for developing “**strategic intelligence**” at all levels of the administration, including the application of strategic instruments, such as vision building, scenario techniques, technological foresight and roadmaps, and SWOT analysis (strengths, weaknesses, opportunities, threats). This will require improving the capability of all levels of the national administration to apply strategic instruments and initiate strategic processes for innovation support, including cross-departmental and sectoral cooperation and coordination. A consultation process should be initiated involving the main representatives of policy, administrative, industry, science, civil society and regional authorities or agencies. Policymakers should consider including external (independent) knowledge from national or international experts who could play the roles of moderator and enabler of strategy processes as well as bringing in their international experience.

The fact that strengthening policy implementation will inevitably require additional public investments heightens the need to develop accountability and to ensure the effective use of any increased funding. This requires establishing evaluation as part of any institutional, legal or financial change. In the medium to long term this is the only way to improve effectiveness of funding and implementation even though, initially, it may seem like a waste of resources. Effective evaluation 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 organizations and donors.

With a view to also improving **transparency in the implementation of support and funding schemes**, and as an essential instrument for creating policies based on evidence and adjusting them over time (policy learning), it is necessary to improve data collection, monitoring and evaluation. This includes implementing evaluation and monitoring systems within the context of specific funding and support instruments, as well as generating and providing innovation-related statistics that meet international standards. Such a system could include the development and implementation of output and impact indicators, which are published regularly, and guarantee transparency in public activities and their results. Special

analyses of particularly important areas for innovation and technology (e.g. sectoral studies, impact analyses, and regional analyses) should be carried out.

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. This is production-related knowledge that 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 technological efforts are 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 the mastery of production skills - and in this way assist 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 products whose quality is sufficient to command prices that cover these higher costs, and/or where innovative production methods compensate by reducing other costs. In addition, being able to offer world-quality goods is, today, the key precondition for gaining access to global or regional value chains. Most Tajikistani exporters today have difficulty complying with quality standards for export markets in terms of product features, health and safety.

Tajikistan should take steps to further **support improvements in the production capabilities of those enterprises** that matter most for innovation and economic growth. Policies to strengthen production capabilities should focus on the capability to produce according to internationally recognized standards, to differentiate products and services based on higher quality, and to use and adapt technologies and business processes. Authorities could create a national awareness-raising campaign and support programme for the implementation of international quality standards, including training and other forms of assistance that would allow enterprises to acquire certification for compliance with ISO standards. While this should eventually become a national programme, these activities could be initiated at first in specific sectors where there is a critical level of awareness that quality is a key precondition for exporting. Possible natural candidates for such sectoral programmes in Tajikistan could be food processing, software, or the textiles or metals sectors. Additional policy support should also be provided for the creation and registration of trademarks as a way to create brands that enable companies to profit from the increased market value created by quality improvements. Vocational, on-the-job and life-long training and learning should be further encouraged. These are key capabilities that workforces need if enterprises are to deploy, use and adapt new technologies and processes, and to bring new or better products and services to the market. Even though Tajikistan has made progress in this area, there is scope for further improvement.

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

Authorities should **increase the quality of education as a strategic modernization project**. Evidence suggests that Tajikistan is investing in education at levels comparable to countries at a similar stage of development. However, there are also indications that the quality of its education is falling behind. 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. Policymakers should also modernize 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 ways in different subject areas but which should be considered as strategically important by the Government. There is also a need to establish a dedicated programme of short- and medium-term international training programmes for researchers, scientific staff and students. Similar to our recommendations for Armenia, we see a strong need for a Tajikistani version of Kazakhstan's Bolashak programme, a scholarship awarded to high-performing students from Kazakhstan to study overseas on condition they return to Kazakhstan after graduation. Such a Tajikistani programme could 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.

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. In addition to the policies recommended elsewhere in this review for improving the general business and investment climate, the authorities could negotiate arrangements with major foreign investors based on explicit contracts with their local subsidiaries, in order to create skills that can also be useful for other Tajikistani firms. These should be cost-sharing partnerships (where, for example, some or all of the Tajikistani government's costs could be covered by tax breaks) with the local subsidiaries of multinational corporations (MNCs) in order to expand the scale of their training in technical skills beyond their own requirements and increase the pool of skills available to the industry as a whole. A carefully designed policy is needed that avoids subsidizing training activities that would have taken place anyway and provides incentives for additional training to upgrade skills could be a highly effective mechanism to generate skills needed for the economy. This would be a good way to

speed up the emergence of a local industry which is now a limiting factor of growth. Relatedly, local educational institutions could be involved in these training activities, generating further spillover effects for local vocational training. In addition, the authorities should look to create additional and expand existing “free economic zones” in order 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 investor firms once they are established. In view of this constraint, free economic zones should be promoted on an ad hoc basis in order to accumulate experience, attract investors and learn from other countries’ experiences. In this area, Tajikistan could benefit from international assistance.

In Tajikistan, the private supply of business services remains at a very early stages. Whether it will be the private or the public sector that takes the lead in providing collective support services for the innovation needs of firms and other actors in local and regional innovation systems remains unclear. An innovation-related specialized service infrastructure in areas such as basic investment promotion, technology extension services, standards and metrology, productivity centres, and information and communication services are still very much undeveloped.

Authorities should **create basic business support services** linked to an **“exports as a springboard to development” agenda**. Tajikistan is at the very beginning of building organizations able to directly support innovative projects or provide business services to support innovation. As a first step, authorities should seek to create business development and support services, such as export and investment promotion, and country marketing. It is also important to create capacities in metrology, testing and quality assurance in order 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 organizations providing assistance to enterprises in these areas, and the Government should aim to create them on a step-by-step basis. The creation of productivity and demonstration centres could help firms improve productivity and quality. These should be initially funded by the Government to raise awareness of the need to enhance productivity. The creation of technology extension services has the potential 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.

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

Authorities should **encourage domestic R&D programmes** to focus on the **adaptations of existing 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, while focusing the majority of public funding of R&D on the adaptation of imported technologies to local conditions. This orientation towards identifying and creating local relevance for existing R&D should be built into the R&D funding system through the criteria used for the eligibility and selection of projects and then the evaluation of their success. For example, in agriculture the focus of R&D should be placed on how local conditions (soils, climates, weather, pests

and tastes) affect food products. For industry, the focus of R&D should be placed on adapting to differences in available raw materials and local preferences. Finally, for services, the focus of R&D should be placed on adapting to differences in organization, legal systemic, cultural norms, and customs. Beyond this, there can be room in some disciplines for basic research if closely linked to education. Finally, the participation of Tajikistani research organizations in international projects on climate change should be supported. 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. Thus, demand for local expertise in this area is likely to grow.

Economy-science linkages and collaboration in the innovation process

Few economy-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 technology transfer and commercialization capabilities. Innovation policy is about more than scientific invention and, when setting the policy agenda, the 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 the creation of these linkages by business and science stakeholders, but they cannot be created or dictated by orders from ministries. The main target for Tajikistan is to upgrade its technology level and diversify its economic structure. Adaptation-based innovation may facilitate a shift from the import of goods toward more FDI-supported import substitution. By attracting more foreign investors, there will be an increased transfer of up-to-date technology, marketing methods and organizational techniques. FDI policy should devote more attention to encouraging visible and invisible knowledge inflows and a much broader involvement of local actors ranging from small businesses and education organizations to science organizations.

Innovation policy should seek to **strengthen adaptation-based innovation capabilities** by encouraging ESLs, and supporting market demands for novelty. Attempts should be made to move away from isolated ESLs that are managed via government intermediaries towards facilitating direct collaboration between industrial/agricultural and science actors. Investment in education and training capabilities at HEIs to support both adaptation- and research-based technology transfer should be facilitated by channelling donor and FDI-related training programmes. University professors should be encouraged to lecture at companies, and discuss topics of mutual interest. Direct incentives should be introduced to encourage business organizations, farms and regional authorities to establish or broaden linkages with science and the government should allocate sufficient financial resources for creating these incentives. There should also be special incentives for FDI to use local science capabilities, either as part of technology transfer activities or by acquiring inventions from local scientific organizations.

Since adaptation-based innovation is crucial for the country, innovation policy should devote attention to **foreign technology transfer-related ESLs** as well as the **commercialization of domestic scientific results**. It will be important to facilitate 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. An evaluation of existing technoparks in Tajikistan should identify lessons learned and promising candidates for

targeted support to develop spin-offs, incubators and technology transfer capacities, potentially drawing on foreign expertise. Technoparks should be reclassified from the legal status of non-commercial organizations to not-for-profit organizations, thereby strengthening their right to sell their products. There should be specific support to the ESLs most likely to lead to successful adaptation, and penetration of foreign technology, whether that technology is acquired through imports or FDI.

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

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 Tajikistan's scientific performance and capabilities** in existing fields and existing R&D organizations/departments against international standards, shifting resources away from low priority areas of weak performance. Based on this evaluation, support should be continued in relatively strong fields where a critical mass of intellectual capacity is available or may be achieved within a few years. New strategies should be developed in those research areas that are important fields for the economy of Tajikistan and where current physical research infrastructure is outdated but where there are good intellectual capacities. New legal and organizational forms should be devised for institutes that need to transform themselves into technology support institutes in either a for-profit or not-for-profit form. Competitive funding for R&D should be expanded and made conditional on the establishment of collaborative linkages between science organizations and industry.

The 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 receive relevant information. This makes it difficult for businesses to realize when there is potential for cooperation with science organizations and to identify those organizations possessing the relevant competencies for cooperation.

It is important to **improve access for businesses to information on the research capabilities**, activities and results of scientific organizations as a basis for identifying and realizing the potential for enterprise-science cooperation. Relevant ministries could organize a series of workshops where economic and scientific actors discuss topics of mutual interest. Events should also be organized to upgrade the knowledge of policymakers, civil servants, business people, students and the public about the results of scientific research and its possible applications.

There is a need in the medium- to long-term to increase **awareness of intellectual property rights** (IPRs), with measures targeting researchers, professors, students and scientific organizations generally. There should be specific training efforts for technology transfer managers, as well as for specialists in intellectual property with special attention to the staff of patent attorneys. Domestic inventors should also be supported in their efforts to secure patents abroad. The development of indicators for a technological balance of payments for Tajikistan would provide a useful tool for policymakers who seek to diminish the imbalance in licencing, know-how and other invisible trade.

Promoting entrepreneurship and the financing of innovative businesses

The Government rightly considers support measures for entrepreneurship as a priority agenda item in Tajikistan. In addition to the quality of the business and institutional environment, we consider below specific policies that are important for supporting entrepreneurship.

The authorities should consider raising awareness of the positive potential and significance of entrepreneurship and **promoting a culture of entrepreneurship in society**. This could include introducing entrepreneurship classes into the curricula at various educational levels, as well as running public awareness-raising campaigns on the importance of entrepreneurship for socio-economic development. Capacity building should also be offered 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 to 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 SMEs 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 also reduces the interest rate at which loans can be made available.

The authorities should consider **facilitating the use of existing assets as collateral**, following the recent recommendations of the OECD, other international organizations and domestic stakeholders. Measures could include increasing the range of assets that are legally acceptable as collateral and clarifying collateral and provisioning requirements, as well as reforming land ownership legislation¹ and land registration (cadastre) so that real estate can be used more easily as collateral to secure loans. There is also a need to create a fully-functioning registration system for movable assets and to make credit information services broadly accessible. Systemic support should be provided to innovations in the financial sector, including information technologies.

For **innovation projects where risks are particularly high**, or for projects to be undertaken by new firms lacking credit histories and assets that could be pledged as collateral, **additional policy support may be needed to secure project funding**. This could include 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

¹ Strictly, rather than “land ownership”, it is more accurate to refer to the granting of the right to use land to a person for life, along with right of inheritance. One possibility is to develop and institutionalize “pledge of right”, which although established under the Civil Code (arts. 326 and 364), Land Code (art. 27(1)) and Law on Mortgages (chapter 9) of Tajikistan, lacks the necessary institutional mechanism. This means banks do not in practice lend money based on right of land use as collateral.

guarantee activity). Existing programmes for the provision of loans on preferential terms should be expanded, for example the State Fund for Support to Entrepreneurship. Financial support for new entrepreneurs could also be made conditional on successful participation in entrepreneurial and financial literacy training and on the presentation of a promising business plan developed during the training.

Tajikistan could benefit from **designing and gradually putting in place a mass-scale, micro-credit entrepreneurship support scheme** - as an engine to drive development - based on innovation and entrepreneurship. A first step could include liaising with international donor organizations to discuss the concept of the scheme and explore their interest in providing support within the context of the whole set of envisaged reform measures. There is also an opportunity here to build upon the positive lessons from the operation of the State Fund for Support to Entrepreneurship, by applying this scheme horizontally to entrepreneurs in a wider range of economic sectors and activities. The sequencing of implementation for such a micro-credit scheme could follow the sectoral priorities as defined in recommendation 2.1. In particular, entrepreneurship in agriculture could be a specific target of a support scheme. Such a scheme could include options for entrepreneurial support to young people, including the support of university start-ups and/or spin-offs, as well as targeting country-wide coverage with local outposts catering to local needs, and assistance to local entrepreneurs in identifying local development niches.

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

It is important to **encourage Tajikistanis 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. Specific support instruments could be created to target returning migrants with entrepreneurial ambitions (following the recommendations of the 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. Domestic banks and micro-credit institutions should be connected to international money transfer organizations abroad in order to facilitate the transfer of remittances into savings/investment accounts in the domestic financial industry, and this industry should be encouraged to develop financial products that are tailored to the needs of migrants and that link different savings and investment products. Investments by migrants into entrepreneurial activities could be matched with an equivalent subsidy by public and donor funds, while privileges could be introduced for micro-credit applicants who manage to attract matching funding originating from remittances.

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. While these relations provide opportunities for knowledge exchange and innovation, more could be done to expand these opportunities and strengthen relations with additional partners.

The Tajikistani Government should continue to **strengthen the linkages between all the 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. Measures could include a further simplification of the bureaucratic requirements and procedures regulating inward foreign direct investment, additional incentives, and decreased tax rates. Policymakers should also develop 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 an overarching vision, clear priorities and goals. There is a need to continue proactively learning about best practices from counterparts in partner countries. The authorities should further develop, where possible, new regional and international cooperation initiatives in the area of innovation and research. There is a need to create new opportunities for 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 with counterparts from traditional partners such as Russia, other ex-Soviet republics and some of Tajikistan's neighbouring countries. However, its universities and research centres are less well connected to scientific centres of excellence located elsewhere. As Tajikistani universities have not yet made it into the main international university rankings, further work must be undertaken before they will be able to improve their international standing.

Policymakers in Tajikistan should consider introducing additional measures to **increase the current low participation rate of Tajikistani researchers in cross-border and international cooperation programmes** (and publications) in research and innovation. These could include creating incentives for research institutes and universities to enter new and existing S&T alliances with strategic international partners, as well as regularly reviewing the roles and focus of divisions responsible for the international relationships of research organizations. Researcher involvement in international conferences, exchanges and training seminars should be supported, as well as staff cooperation with international peers on co-authored publications. Measures should be introduced to make Tajikistani universities and research centres more attractive for international visiting fellows, and to organize academic conferences and similar events in Tajikistan. It is recommended to proactively invite international and Tajikistani scientists and researchers working abroad to take part in relevant research events and activities in Tajikistan.

The authorities should further **promote the mobility of researchers, scientific staff and students**, for example by strengthening the Durakhshadagon programme of international presidential scholarships by further clarifying its rules and systematically assessing its results with a view to identifying areas for improvement. Progress is needed in making the

Tajikistani education system compatible with those in European countries, as well as in developing, modernizing and disseminating new curricula and internationally compatible teaching methods and/or materials. There should be supporting educational modules in English and other foreign languages.

While the Academy of Sciences displays some information on its website regarding cooperation agreements, the information is not shared in a way that promotes such activities. **A further development of (informal and formal) information sharing channels** could support the greater use of opportunities for participating in international funding programmes. This could include a database with information regarding previous, upcoming and regular open calls to tender launched by international funding bodies. A network of staff in universities responsible for promoting internationalization could be created and connected to similar bodies/associations in partner countries, alongside a support network consisting of Tajikistani researchers or entrepreneurs with experience in applying for competitive funding or participation in international research and scientific projects.

Support should be provided to research and scientific staff (as well as PhD students) for the **preparation of grant and other competitive funding applications**, and draft proposals of all types aimed at international funding sources. This could include a “train the trainer” initiative, whereby a national 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. Training could be offered in a number of relevant areas, such as academic writing in English, international funding opportunities, etc.

Chapter 1

RECENT ECONOMIC AND INNOVATION PERFORMANCE

In 2014, Tajikistan moved from being a low income to a lower-middle-income economy according to the World Bank classification, with a gross national income (GNI) per capita of around \$1,060 in 2014 (\$2,630 on a PPP basis). This is the result of strong growth in real GDP, which has expanded at an average rate of 6.8% per annum over the past decade.² Therefore, there has been considerable economic progress given the initial challenges from being one of the lowest income Soviet republics at the time of independence and suffering a damaging civil war from 1992-1997 that severely hampered economic development, and from which real GDP per capita has still to fully recover. At the same time, poverty rates have declined rapidly over recent years, while life expectancy has risen.

Major exports include aluminium and cotton, which are subject to significant fluctuations in market price. Tajikistan has (small) net exports of electricity at present, although a mountainous territory means there is significant potential for hydropower development. Major imports include petroleum products as well as grain and flour.

1.1 Economic structure

While services have grown steadily to account for 51% of GDP by 2013³, agriculture is the largest single sector, accounting for 23.5% of GDP (Table 1) in 2014 and 46% of employment in 2014.⁴ The main crops are wheat and cotton. Industry's share of GDP has declined over the past decade, from around 24% of GDP in 2004 to 12% in 2014 (Table 1), at the same time the share of the food subsector within industrial output increased from 16.6% in 2001 to 27% in 2010. Together with agriculture, this indicates the considerable significance of the agro alimentary sector to the economy of Tajikistan. Nonferrous metallurgy accounts for a significant share of industrial output – just over one third in 2010. The private sector accounted for around 64% of employment in 2014.⁵

The construction sector has been a less significant source of macroeconomic volatility than in many other transition economies during the financial crisis, with its share of GDP peaking at around 10% during 2008-2010, falling to a low of 7.9% in 2011, and since recovering to again around 10% of GDP.

² World Development Indicators (WDI), real GDP (constant 2005 USD terms), World Bank.

³ Share of GDP by value added, WDI, World Bank.

⁴ Source: TajStat and UN staff calculations.

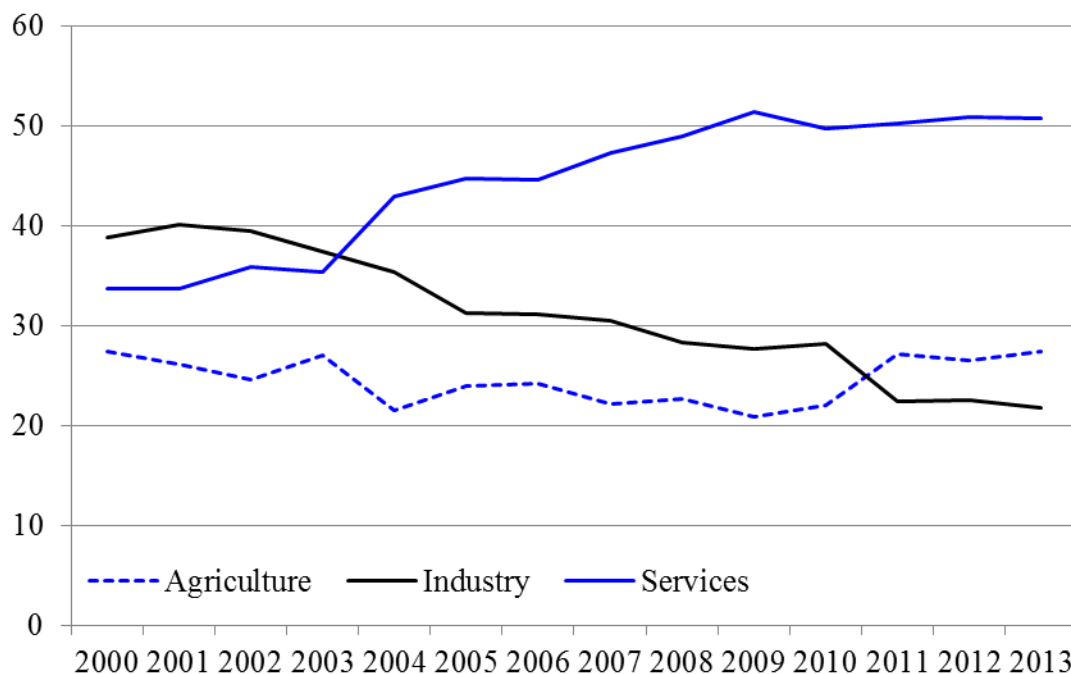
⁵ Source: TajStat.

Table 1. GDP composition by sector, shares in per cent, 2004-2014

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Industry	23.6	22.7	21.3	18.3	14.2	14.3	14.7	14.6	13.7	13	11.9
Agriculture	19.2	21.2	21.5	19.4	19.9	18.6	19.6	23.8	23.3	21.1	23.5
Construction	7.5	4.6	6.1	8.1	10.3	10.2	10.2	7.9	8.4	10.2	10
Trade	16.1	16.2	16.9	16.4	19.4	20.8	20	13.1	13.9	15.7	14.4
Transport and communication	6.6	7.4	7.2	9.5	10.1	11	11.2	14.5	15.3	13.9	13.2
Logistics	0.4	0.3	0.2	0.2	0.8	0.2	0.2	-	-	-	-
Other branches of material production	0.4	0.3	0.3	0.2	0.2	0.1	0.1	-	-	-	-
Market and non-market services	15.1	15.6	15.3	15.3	12.5	13.7	12.8	13.7	13	13.4	13.3
Excise taxes	11.0	11.5	11.4	12.5	12.6	11.1	11.2	12.4	12.4	12.7	13.7
GDP	100	100	100	100	100	100	100	100	100	100	100

Source: TajStat analytical table “Nominal GDP by branches of origin, 1995-2014”

Data from World Bank WDI highlight a similar trend, although on a different measurement base, of a declining share of GDP for industry over the period 2000-2013 (Figure 1):

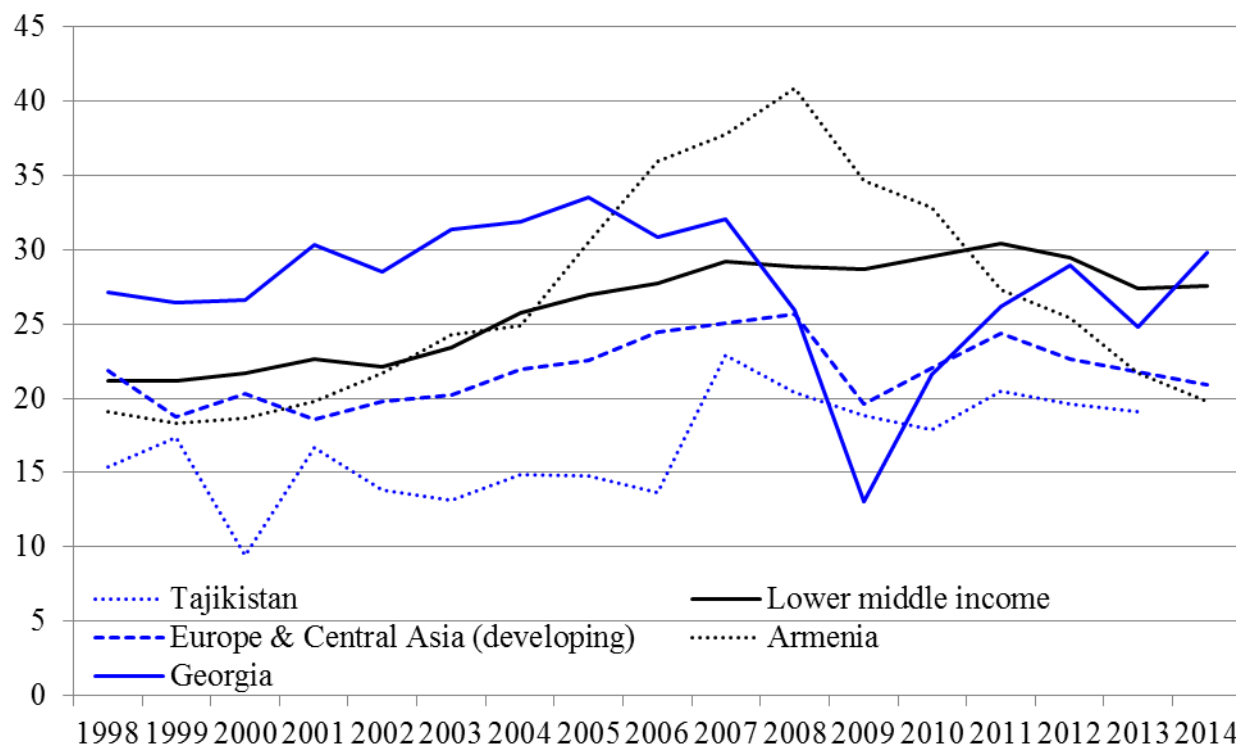
Figure 1. Services, agriculture and industry in GDP, shares in per cent, 2000-2013

Source: World Development Indicators (WDI) data set, World Bank, shares by value added.

There is evidence that remittances have sustained consumption rather than financing investment. However, over recent years, there has been some increase in gross capital

formation as a share of GDP (Figure 2), with Tajikistan converging towards relevant comparators for the region and lower-middle-income economies, as well as towards levels seen in economies such as Armenia and Georgia, which are also highly dependent upon remittances.

Figure 2. Gross capital formation, per cent of GDP, 1998-2014



Source: WDI data set, World Bank Group

1.2 The public sector

The IMF concluded Article IV Consultations with Tajikistan in June 2015, noting a largely balanced fiscal position over recent years with low debt, although fiscal space has been reduced by rising interest rates on public debt, and contingent liabilities.⁶

The estimated 2014 budget surplus increased to one percent of GDP, with tax revenue performance in 2013 and 2014 stronger than expected, in part because of a simplified tax code introduced in 2013. The IMF Executive Board noted in June 2015 that spending was in line with projections, while capital spending had been below earlier projections, with certain projects delayed, e.g. the Rogun Hydroelectric Power Plant. The current situation was seen as being consistent with debt sustainability and the maintenance of nominal external public debt below 35 percent of GDP. Despite a tougher economic climate, the 2015 budget was expected to be near balance, with budgeted social spending being feasible.⁷

⁶ IMF Executive Board Concludes 2015 Article IV Consultation with Tajikistan, IMF Press Release No. 15/268, 9 June 2015.

⁷ *Ibid.*

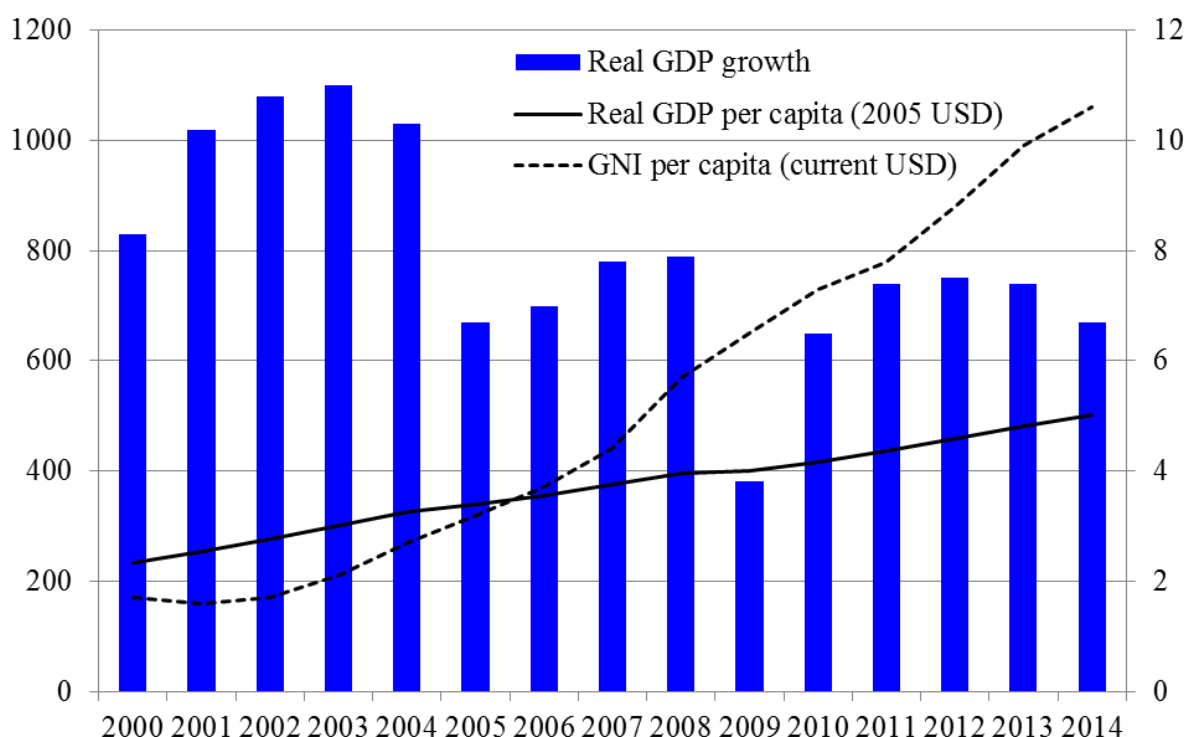
In 2014, fiscal revenues and grants received were estimated by the World Bank to be 28.4% of GDP, with fiscal expenditure and net lending at 29% of GDP.⁸ The private sector accounts for around 70% of GDP, and 64% of employment.⁹ There have been recent improvements in Tajikistan's public finances and fiscal balance, but an estimated reduction in growth to 3.2% in 2015 followed by a gradual recovery presents risks to this progress.

1.3 Economic performance

The past decade has seen significant economic growth – higher than 10% annually over the period 2001-2004, and dipping to just under 4% in 2009 as a result of the global financial crisis (Figure 3). Economic growth rebounded to around 7.5% during 2011-2013.

Importantly, there has been a sustained increase in real GDP per capita, and significant reductions in the poverty rate. The proportion of the population below the international poverty line of \$2.50 per day, measured by purchasing power parity, fell from 40.9% to 33.8%, although this rate of decrease may fall as GDP growth slows over the next few years.¹⁰

Figure 3. Real GDP and current GNI per capita, 2000-2014



Source: WDI data set, World Bank Group

⁸ Tajikistan: Economic Update No. 1 “Slowing Growth, Rising Uncertainties”, Spring 2015, World Bank Group.

⁹ TajStat analytical table “Labour resources and employment, 1985–2014”

¹⁰ Tajikistan: Economic Update No. 1 “Slowing Growth, Rising Uncertainties”, Spring 2015, World Bank Group.

GDP growth faces downward pressure from external factors. The slowdown in the Russian economy and sharp depreciation of the Russian ruble have negatively affected the Tajikistani economy through a dampening effect on exports, as well as by reducing the value of remittances from Tajikistani nationals working in Russia. Prices for cotton and aluminium, two key export commodities, have also fallen.

These economic headwinds have resulted in a modest fall in GDP growth so far, from 7.4% in 2013 to 6.7% in 2014, although World Bank projections suggest this may fall to 3.2% in 2015 before a gradual recovery.¹¹ Inflation also increased from 5.1% in 2013 to 6.1% in 2014. This increase was largely driven by higher food and energy prices pushing up the cost of services. The depreciation of the national currency, the Somoni, has also been an important factor. The World Bank expects inflation to increase to around 10% in 2015 before moderating.¹²

The position of the financial sector has deteriorated somewhat, due to increasing rates of non-performing loans (NPLs), which rose to 27.7% in December 2014 from 23% a year earlier, with actual levels likely higher due to misclassifications in the data.¹³

1.4 Labour force and education

UNESCO data indicate that Tajikistan enjoys a very high adult literacy rate of 99.8% in 2015 - which is significantly above the average of its peer group of lower-middle-income economies (70.5% in 2012), and in line with the high average literacy rate in Central Asia (99.6% in 2015). The youth literacy rate stands at 99.9%.

Tajikistan has seen strong population growth, with an average annual rate of 2% over recent years to reach a level of around 8.2 million in 2015. Expenditure on education as a share of GDP, both in total and on tertiary education, compare well with other countries in Central Asia and the Caucasus for which data are available (Table 2), although this in part reflects high levels of need driven by strong population growth and a young population.

Table 2. Expenditures on education, share of GDP, per cent

	Expenditure on education	Tertiary education
Armenia (2013)	2.25%	0.20%
Azerbaijan (2011)	2.44%	0.36%
Georgia	4.81% (2011)	0.38% (2012)
Kyrgyzstan (2012)	7.38%	0.89%
Tajikistan	4.02% (2012)	0.46% (2013)
Turkmenistan (2012)	3.05%	0.28%

Source: Education dataset, UNESCO.

As analysed further in Chapter 4, gross enrolment ratios are relatively favourable for both secondary (87.0%) and tertiary education (22.5%).

¹¹ *Ibid.*

¹² *Ibid.*

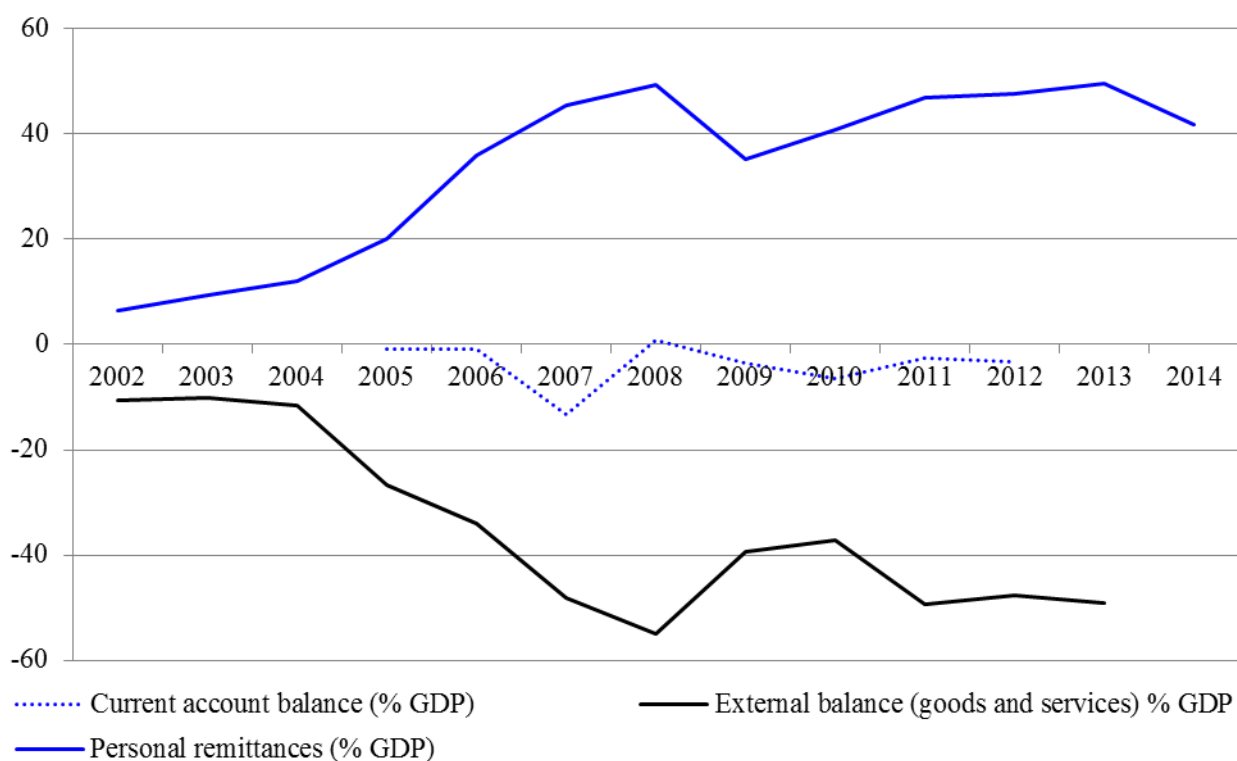
¹³ *Ibid.*

Low wages and high unemployment have been significant drivers of emigration. While the registered unemployment rate in Tajikistan is around 2.5%,¹⁴ ILO modelled estimates suggested a rate of 10.7% in 2013.¹⁵

1.5 International economic relations

In 2014, Tajikistan was the most remittance-dependent country in the world, with 90% of remittances originating in the Russian Federation.¹⁶ The increase in remittances over the past decade, as would be expected and in common with other transition economies receiving significant remittance inflows, has driven a significant external imbalance in the trade in goods and services (Figure 4), with domestic consumption exceeding production:

Figure 4. Remittances and external balances, 2002-2014



Source: WDI data set, World Bank Group

After peaking at 13.3% of GDP in 2007, the current account deficit has narrowed significantly, but would have been larger in the absence of migrant remittances.

It is useful to examine the structure of imports and exports (Table 3) in a more disaggregated form, which reveals particularly strong growth in imports of petroleum products, as well as grain and flour, while other key exports such as cotton fibre have remained relatively static.

¹⁴ *Ibid.*

¹⁵ WDI data set, World Bank Group.

¹⁶ *Ibid.*

Table 3. Structure of imports and exports, \$ million, 2003-2014

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<i>Imports</i>												
Natural gas	24	28	27	35	65	74	52	42	48	39	0	0
Petroleum products	73	107	126	191	275	413	323	438	450	425	394	511
Electricity	61	65	58	67	66	90	76	13	1.3	0.1	0.2	0.1
Grain and flour	33	48	76	77	135	207	175	88	125	218	208	257
Other	690	943	1,043	1,355	2,006	2,489	1,944	2,076	2,581	3,097	3,549	3,530
Total Imports	881	1,191	1,330	1,725	2,547	3,273	2,570	2,657	3,206	3,778	4,151	4,297
<i>Exports</i>												
Cotton fibre	193	162	144	129	138	108	100	201	197	224	189	133
Electricity	55	58	53	49	60	62	63	4	4.3	21.3	33.3	48.1
Other	549	695	712	1221	1270	1239	847	990	1,056	1,115	939	797
Total Exports	797	915	909	1,399	1,468	1,409	1,010	1,195	1,257	1,360	1,162	977
<i>Balance</i>	-84	-276	-421	-326	-1,079	-1,864	-1,560	-1,462	-1,949	-2,418	-2,989	-3,320

Source: Agency on Statistics under President of the Republic of Tajikistan

To date, FDI in Tajikistan has been limited. As discussed in greater detail in chapter 7, in 2013, FDI inflows made up just 1.3% of GDP, with Tajikistan ranking 139th in the world on this measure.

1.6 Key innovation indicators

Inputs

Gross domestic expenditure on research and development (GERD) is low, accounting for 0.12% of GDP in 2011, which is somewhat lower than for other relevant comparator countries such as Armenia (0.27%), Azerbaijan (0.21%), Kazakhstan (0.16%) and Kyrgyzstan (0.16%). The equivalent figure for the Russian Federation was 1.12% in 2012. Of this expenditure, a very high share of 82% was funded by the Government in 2011, with only 1.6% from the domestic business enterprise sector. Nonetheless, as discussed further in chapter 4, there have been very strong real term increases in GERD over the past decade, both at the aggregate level and per researcher.

The total headcount of R&D personnel fluctuated during the 2001-2011 period, but in 2011 was 9.4% lower than a decade earlier, standing at 2,537, of which only 26.7% were female according to UNESCO statistics. Of researchers, 87.7% were recorded as being in the governmental sector, with 12.3% in higher education and none recorded in the business enterprise or private non-profit sectors, although they are likely to be present in small unrecorded numbers.

Outputs

As with R&D personnel, no data is collected on innovative activities in the business enterprise sector. As analysed in greater detail in chapter 5, numbers of both PCT and national patents are very low, with a decline in numbers over recent years. Although they have not declined in the same way, petty patents (important for adaptation-based innovation) are also limited in number.

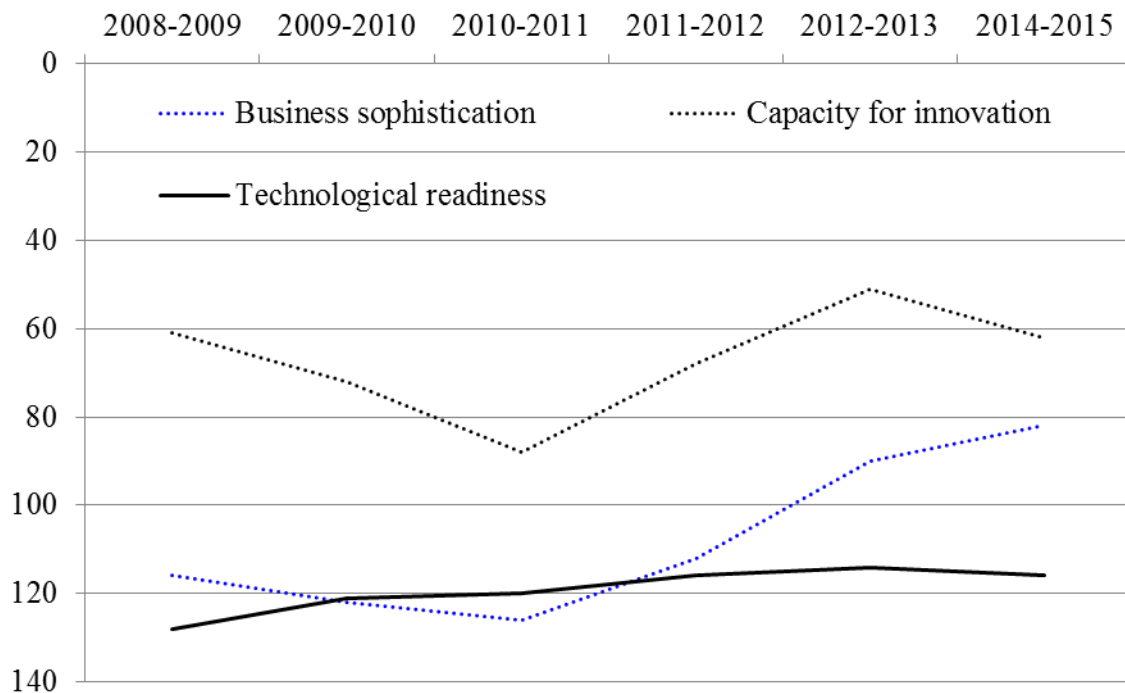
In terms of indirect indicators of innovation, there has been a decline in the share of industry over the period 2004-2013 (table 1), from 23.6% to 13%, which also suggests some loss of competitiveness in this important sector. However, this is partly driven by the very strong increases in remittances over this same period, which have driven a significant proportion of GDP growth.

Global competitiveness and innovation indicators

The World Economic Forum's Global Competitiveness Report (WEF GCR) provides an assessment of 12 "pillars of competitiveness" for a large group of countries, ranking them across multiple dimensions. The importance of the various pillars and the relative weights they receive when compiling an aggregate competitiveness index depend on each country's stage of development. According to the WEF, Tajikistan is still at the factor-driven stage of development - where countries compete on the basis of their factor endowments. Given Tajikistan's recent progress to the World Bank's lower-middle-income category and global resource constraints that increase over time, it will be important to improve the efficiency of resource use as a way of raising labour productivity and wages.

Three of the key "pillars of competitiveness" from the perspective of innovative development are business sophistication, capacity for innovation and technological readiness. Over the period 2008/2009 – 2014/2015 (Figure 5), the most notable improvement was in the ranking for business sophistication (116th to 82nd), as well as the ranking for technological readiness (128th to 116th). The ranking for the strongest pillar of capacity for innovation was little changed (61st to 62nd), but it should be recalled that the number of countries in the rankings increased from 134 in 2008/2009 to 144 in 2014/2015.

Figure 5. World Economic Forum rankings for Tajikistan



Source: World Economic Forum, Global Competitiveness Report. Data for 2013-2014 not available.

The United Nations Industrial Development Organization (UNIDO) Competitive Industrial Performance Index considers three dimensions of industrial competitiveness: the capacity to produce and export manufactures, the level of technological deepening and upgrading and the overall impact on world manufacturing. Tajikistan was ranked in 115th position out of 133 economies in 2010, and was relatively stable over the period 2005-2010, fluctuating between 113th (2005 and 2006) and 117th (2008 and 2009). An area of strength for which Tajikistan ranked inside the top 20 over 2005-2010 was the share of manufacturing value added in GDP (30.4%, ranking 5th in 2010). However, as noted earlier, there has been a decline in industry as a share of GDP, while World Bank data has also indicated a decline in manufacturing as a share of GDP, suggesting some loss in competitiveness.

Chapter 2

NATIONAL INNOVATION SYSTEM AND INNOVATION GOVERNANCE

Chapter 2 introduces some key features of the methodological approach that is followed in the Innovation Performance Review of Tajikistan, which is based on the National Innovation System (NIS) concept. It first provides a conceptual overview of the notion of innovation in the context of Tajikistan as a lower-middle-income economy that remains relatively underdeveloped. The assessment of Tajikistan's NIS, its structure and functioning is undertaken on the basis of the notion of "innovation for development". The chapter proposes a number of conclusions and recommendations to complete the process of building Tajikistan's NIS, as well as to improve its effectiveness and governance.

2.1 Innovation in the context of Tajikistan

While innovation is a broad concept, it is often associated with the successful commercial application of knowledge. The OECD defines four main types of innovation: product innovation, process innovation, marketing innovation and organizational innovation.¹⁷ Each of these may be associated with different enterprises or undertakings, a specific product or service and can be interpreted differently (as an innovation or not) depending on the context. Thus, a product that already exists in one market (and therefore is not an innovation) can be an innovation if introduced into a market in which it was not present before. Importing a technology which is new to the market from abroad or introducing a new organizational model in a firm which imitates existing managerial models from established firms are also considered innovation in such a context.

This conceptual understanding of innovation is an important methodological cornerstone of this Review given the local context and environment in Tajikistan. The main implication is that in underdeveloped economies, such as Tajikistan, which are lagging behind in both their economic and technological development, R&D-based technological innovations may not play a visible role. Despite that, in such environments there can be a vibrant innovative process based on the imitation, adaptation and introduction of products, services and technologies new to the local market.

Moreover, the national context of Tajikistan, as discussed throughout this review, calls for an even broader interpretation of the notion of innovation. Local specificities significantly influence the economy of Tajikistan and drive the local policy agenda. Correspondingly, they also define the nature of the innovation processes that take place in such an environment.

¹⁷ OECD, Guidelines for Collecting and Interpreting Innovation Data (Oslo Manual), 3rd edition. Paris: Organisation for Economic Co-operation and Development, 2005.

Among the important particularities of the local context that warrant a tailored methodological approach are the following:

- According to the World Bank Development Indicators (WDI), Tajikistan is classified as a lower-middle-income economy¹⁸ and until 2014 was the only country in Central Asia falling in the low-income economy classification;
- Tajikistan is a land-locked country, remote from most major markets, with difficult transit routes through its neighbouring countries;
- The Tajikistani economy is very narrowly specialized, with only a handful of products that shape the structure of the economy and the composition of exports;
- In 2014, over 73% of the Tajikistani population lived in rural areas while 66% of all employed persons were occupied in agriculture; at the same time, manufacturing accounts for less than 3% of total employment;
- Simultaneously, the age structure of the population is characterized by a very high proportion of young people: in 2014, young people under 25 accounted for 56% of the total population, with children under 15 forming 35% of the population; and
- Labour migration (mostly of a temporary nature to Russia) is very high, accounting for a sizable share of the working age population; respectively, remittances play an unusually important role as a source of income to the local population and as balance-of-payments support.

There exists a particular strand in innovation literature dedicated to the role of innovation in developing economies.¹⁹ The analysis of innovation processes in such environments led to the rise of the “*innovation for development*” notion to represent innovation-based initiatives that address development issues.²⁰ On the one hand, some analysts point to specific challenges faced by innovators in such environments:

- The overall economic and institutional environment in developing countries may be problematic and unsupportive to doing business, while the physical infrastructure tends to be mediocre;
- Domestic markets in developing economies tend to be small. As a result, it may be difficult to realize economies of scale in local markets;
- The business sector in developing countries is usually dominated by low-tech SMEs and microenterprises, many of which operate in the informal sector of the economy;

¹⁸ As of 2015, the World Bank defines low income economies as those with a GNI per capita of \$1,045 or less in 2013 as calculated using the World Bank Atlas method, while lower-middle-income economies were those with a GNI per capita in the range \$1,046 to \$4,125.

¹⁹ See, among others, Jean-Eric Aubert, Promoting Innovation in Developing Countries: A Conceptual Framework, World Bank Policy Research Working Paper 3554, April 2005; Charles Edquist, Systems of Innovation for Development. Background paper for Chapter 1: Competitiveness, Innovation and Learning: Analytical Framework for the World Industrial Development Report, UNIDO, 2001; Yoslan Nur, Rethinking the Innovation Approach in Developing Countries, WTR (World Technopolis Association) 2012; 1:107-117; Manuel Trajtenberg, Innovation Policy for Development: An Overview. Second LAEBA Annual Meeting, Buenos Aires, Argentina – November 28-29, 2005; Xiaolan Fu, Giacomo Zanella, George Owusu Essegbey, Jun Hou, and Pierre Mohnen, Innovation in Low Income Countries. A Survey Report, DFID – ESRC Growth Research Programme, November 2014.

²⁰ Innovation for Development. A Discussion of the Issues and an Overview of Work of the OECD Directorate for Science, Technology and Industry, OECD, May 2012; Charles Edquist, op. cit.

due to this economic structure, the general technological capability of the economy is also low;

- Accordingly, innovation systems in developing economies are underdeveloped (lacking important building blocks), and fragmented (featuring low connectivity and poor/weak linkages);
- This environment creates suboptimal conditions for undertaking some forms of innovation (in particular, technological innovation);
- While finance is a major constraint to innovation in many countries, it is especially acute in developing economies as potential innovators in such economies have a very limited ability to bear risk (due to, amongst other things, low personal income, low savings, underdeveloped financial markets); and
- Mirroring the elevated uncertainties in the business environment, planning horizons tend to be rather short in developing economies; this affects both the motivation of entrepreneurs to undertake longer-term innovative projects and the supply of long-term finance to back such projects.

At the same time, the literature also highlights the existence of specific opportunities for innovators in developing economies:

- While the existing gap in the technology frontier is a challenge in developing economies, it also offers enormous opportunities for catch-up and productivity growth on the basis of knowledge and technology transfer;
- The economic and institutional environment in developing economies is not an obstacle for some forms of innovation, in particular, innovation based on adoption and adaptation, being of an incremental rather than a radical nature; as a result, learning, as well as the local diffusion of knowledge, plays a crucial role in the emergence and proliferation of this type of innovation process in developing economies;
- There is immense untapped potential in promoting and developing grassroots innovation²¹ in developing economies which can offer win-win solutions, on the one hand for development and economic growth and, on the other, for addressing local needs and problems; besides, grassroots technological innovations tend to be needs-based, simple and cost-effective;²²
- The agricultural sector, which weighs considerably in most developing economies, also offers considerable opportunities for innovation for development, especially based on the introduction of new technologies; and
- There is also considerable room for managerial and organizational innovations which are not resource-demanding; there is evidence of entrepreneurs applying innovative pricing and financing strategies and business process innovations to serve lower-income markets profitably.²³

²¹ Grassroots innovation usually refers to the bottom-up initiatives of local stakeholders that seek novel solutions to (mostly local) social challenges or development issues.

²² Yoslan Nur, Rethinking the Innovation Approach in Developing Countries, World Technopolis Association 2012; 1:107-117 (<http://dx.doi.org/10.7165/wtr2012.1.2.107>).

²³ Caroline Paunov, Innovation and Inclusive Development: A Discussion of the Main Policy Issues, OECD Science, Technology and Industry Working Papers, 2013/01, OECD Publishing (<http://dx.doi.org/10.1787/5k4dd1rvsnjj-en>)

Innovation based on adoption and adaptation (mostly through importing) can help address some of the challenges that innovators face in developing economies and mitigate some of the associated risks. In particular, the risk of market acceptance (a key risk globally in the case of new products and services), is significantly lower when introducing to the local market an innovation which has already been proven abroad. When adopting and adapting to the local market a product or technology from abroad, the time horizon is much shorter compared to an invention, as some of the essential phases (such as proof of concept, scaling-up etc.) can be skipped. The financing requirements may be lower given that there is less need for R&D and that the innovation may be embodied in a piece of imported machinery which can be produced with economies of scale abroad. Related to this, there is also no need for more sophisticated forms of innovation financing (such as business angels or venture financing), thanks to the lower risk and the possibility to use imported technology as collateral. Plus, the innovation is less likely to be made by start-ups with no track record, and more likely by established firms with a proven record of revenues, expenditures and credit.

There are important policy implications for the recognition of the specific features of “innovation for development” and the need to adhere to the broad understanding of innovation as novelty in the local context of developing economies. Among them are the following:

- Innovation for development is a multifaceted paradigm that can generate a multitude of positive socio-economic outcomes, contributing to job and income growth, skills development and economic diversification;
- Innovation for development policy must target the development of specific innovation capabilities. As imitation and adaptation are the main avenues for pursuing innovation (and, hence, development and economic diversification), these should also be at the centre of policy focus;
- Related to this, policies should prioritize the promotion of technology diffusion, adoption and adaptation: the capability to transfer and operate existing technologies in the specific local context and environment;
- The promotion of knowledge and technology diffusion can be pursued through different policy instruments in areas such as metrology, standards and quality control, extension services, information and training programmes, demonstration and pilot projects.²⁴ Importantly, the implementation of many of these policy instruments is not excessively resource-demanding;
- To be successful, policy must be tailored to the specificities of the business sector and its composition as outlined above;
- The narrow specialization of the economy can also be regarded as an opportunity as it prompts some natural points of departure for innovative ventures that build on already established economic sectors;
- As the most promising and successful innovation practices are local (such as grassroots innovation), so policy support should also be localized in order to be more effective; promoting the demand for local innovation can play a key role in this;
- Related to the above, good practice in different countries suggests that successful innovation for development policies tends to be bottom-up and not top-down; the

²⁴ Jean-Eric Aubert, op.cit.

rationale is to establish an enabling environment and incentives for local innovative entrepreneurs; and

- Given the resource constraints (in terms of finance, capacity and capability), faced by all countries with developing economies, innovation for development policies should be pursued in a gradual manner and must be closely tailored to the specificity of the local context.

Many of the specific features of innovation in developing countries outlined above are relevant in the context of Tajikistan. The recognition of these specificities and their policy implications is a guiding principle both in the assessment of the national innovation system in this chapter and in the detailed analysis of different aspects of the innovation system in subsequent chapters.

Generally, innovation is a complex process, involving interactions with a whole range of innovation stakeholders: Innovative entrepreneurs, academic and R&D institutions, the business sector (as both source and target of innovation), innovation intermediaries and support institutions, public bodies with the responsibility to support innovation, financial institutions, national policies in the area of innovation, the framework conditions for innovation, consumers (more generally, the market for innovation), etc.

The journey from idea to market requires the mobilization and application of many capabilities and skills. The smaller the entity embarking on this journey (in particular, individual entrepreneurs), the less likely it is to have at its immediate disposal all the capabilities needed for successful completion. Innovation therefore requires the cooperation of many actors and stakeholders who bring to the process their different capabilities. Stakeholder cooperation is another important feature of the modern innovation process and is integrated into this review's methodological approach. This perspective suggests that while different actors may be reluctant to engage with others (due to a lack of tradition, concerns about possible loss of competitive edge, etc.) cooperation is an essential ingredient of a successful innovation process. Lack of or insufficient cooperation between innovation stakeholders can be considered a systemic failure. Therefore, there is a rationale for addressing such problems through policy intervention, and in fact a number of innovation policy instruments specifically target the promotion of cooperation in the innovation process.

On the other hand, the reluctance of some stakeholders to cooperate with others may be well justified and grounded if the economic and business environment does not address their concerns. These may relate to the poor protection of property rights, weak contract enforcement, an uncertain and unpredictable business and regulatory environment as well as other risks associated with the joint implementation of combined efforts and ventures. All these features are part of the framework conditions for innovation and are a key ingredient of successful innovation.

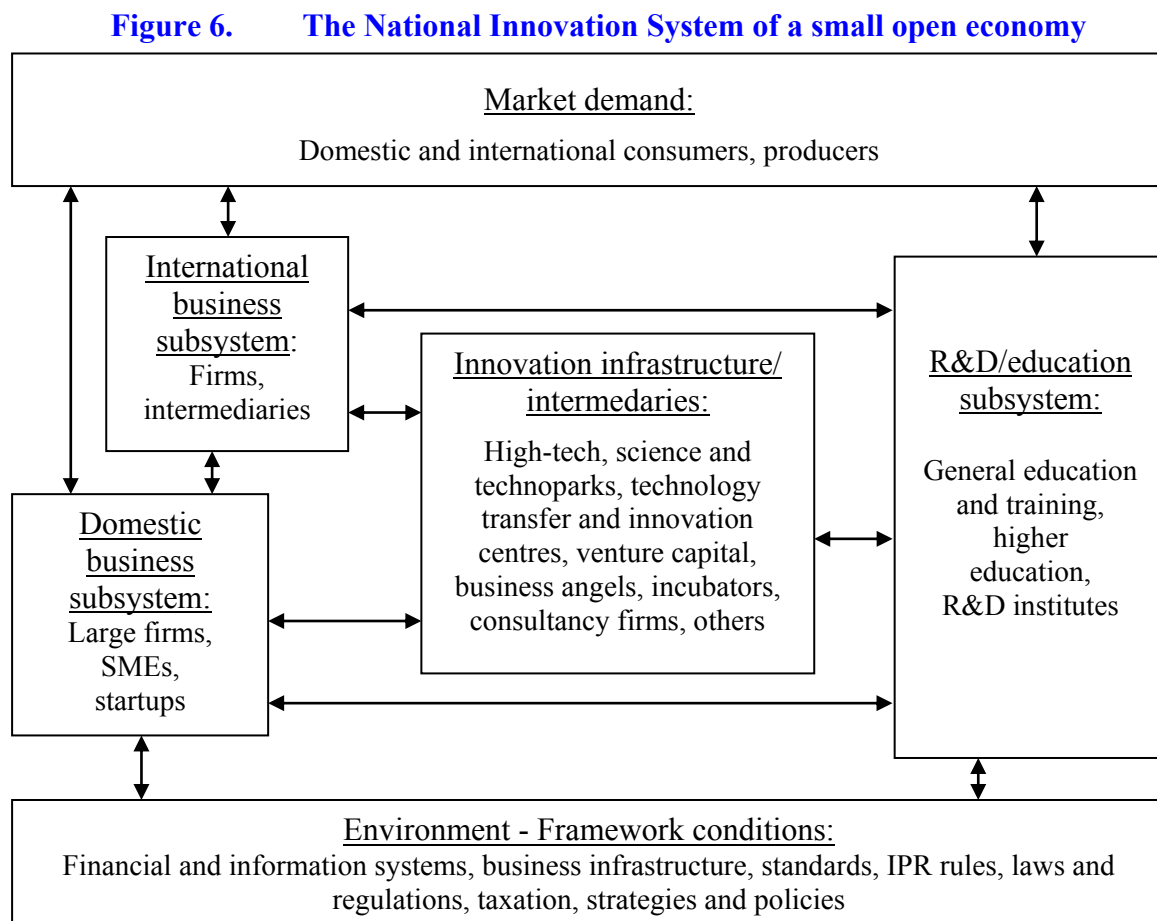
Finance is also a central component of the innovation process. Transforming an idea into a marketable product or service is not only a long and risky process, it can also be costly. Many innovative ventures fail as a result of a lack of vital financial resources. Moreover, due to the high risk involved, many conventional financial institutions avoid financing innovation. The success of innovation activities is conditional on the existence of specific financial institutions such as business angels, venture capital firms and specialized public funds. As these institutions absorb the risk of early stage financing, their lack can effectively thwart an

otherwise vibrant innovation process and frequently reflects an immature market environment or market and/or systemic failures.

2.2 The national innovation system of Tajikistan

National Innovation System

This review is built around the concept of National Innovation Systems (NIS). This concept reflects the fact that innovation takes place within a system (the systemic view of innovation) where systemic interdependencies influence the processes of generation and diffusion of innovation in the economy. The NIS (Figure 6) can be broadly defined as “*the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies*”²⁵. The systemic approach to innovation helps to identify specific aspects (strengths, weaknesses, driving forces, etc.) of the innovation process and to identify possible policy actions and measures that could lead to improvements in innovation performance.



Source: Adaptation from: C. Freeman (1987), National systems of innovation: the case of Japan, in: Technology Policy and Economic Performance, London, Printer Publishers.

²⁵ Chris Freeman (1987), Technology Policy and Economic Performance - Lessons from Japan, London: Pinter Publishers.

The efficient functioning of an NIS is generally determined by a number of key subsystems. One such subsystem is the presence of the (national and international) market for innovative products and services, since innovative products ultimately need to reach the market. Another key subsystem is the (national and international) business sector both as supplier of innovative products and as an important driver of the demand for innovation. A third key NIS component is the subsystem of knowledge generation, which includes academic and R&D institutions. The subsystem of innovation intermediaries providing various innovation support services supports different stages of the market uptake of innovative ideas. Finally, there exists a subsystem of the business environment and framework conditions that shape the incentives and motivation of all participants in the innovation process. A functioning network of linkages between these subsystems is a precondition for collaborative interaction between innovation stakeholders and is, therefore, an important building block for an NIS.

National Innovation Systems in small open economies such as Tajikistan have a number of specific features. First, limited local markets call for a high degree of integration into the global economy and fully-fledged participation in the international division of labour. Well-functioning bidirectional linkages to large international markets are one of the preconditions for local firms to grow and a necessary condition for the inflow of modern technologies and new ideas. These linkages are important for the connection of local innovation stakeholders to international partners and, eventually, for the establishment of stable partnership relations within global supply and value chains. The existence or absence of vibrant and well-functioning linkages can be partly attributed to geopolitical factors and other national specificities. At the same time, they are also, to a large degree, the result of national policies to develop sustainable international linkages.

As discussed in the previous section, this Review's methodological approach upholds the understanding that innovation systems have a different role, outreach and function in different contexts. In the environment of less-developed economies with immature markets, the national innovation systems also tend to be immature and underdeveloped. Furthermore, in such an environment, the national innovation system encompasses a range of functions that have relevance both for innovation proper and for economic development in the broader sense. For this reason, it is more appropriate to speak of the national innovation-for-development system. In what follows, with reference to Tajikistan, the term "national innovation system" will refer to the innovation-for-development system.

It is important to bear in mind these qualifications in terms of both the assessment of the existing national innovation system in Tajikistan and policy recommendations for its further development and strengthening in order to move toward a well-functioning NIS. Some innovation experts emphasize that any analysis of an NIS in a developing country should primarily seek to identify the elements that are key for the emergence and development of a fully-fledged, socially-inclusive innovation system and the design of systemic innovation policies²⁶.

²⁶ Cristina Chaminade, Bengt-Åke Lundvall, Jan Vang-Lauridsen, K. J. Joseph, Innovation Policies for Development: Towards a Systemic Experimentation-Based Approach. 7th Globelics Conference, Dakar. 6-8 October 2009.

In line with these recommendations, this review seeks to identify any missing or weak elements in the Tajikistani NIS that might play a critical role for the successful emergence and functioning of vibrant innovation-for-development processes.

This aspect of our methodological approach also has important implications for the formulation of key review recommendations. Obviously, given the underdeveloped nature of the innovation system in Tajikistan, the range of possible policy recommendations for moving closer to being a well-functioning NIS is very wide. At the same time, both the administrative capacity of the country to implement such a broad set of recommendations and the resources available for this purpose are limited. Therefore, this review seeks to limit the range of recommended policy actions to:

- A core of “critical” measures that will have the most significant and immediate effects in terms of innovation-for-development;
- Measures that are less demanding in terms of financial and human resources for their implementation.

Furthermore, the team undertaking the review has carried out one additional step by prioritizing its policy recommendations based on the expert judgments of its members. The results of this assessment are presented in the Executive Summary.

Tajikistan’s innovation-for-development policies and institutions

The decade following Tajikistan’s independence was very turbulent and dominated by a violent civil war. Even though fighting ended in 1997, it took several more years for society to concentrate on policies of peaceful state-building. Naturally, the policy priorities in these years were dominated by the efforts to establish constitutional order and functioning public institutions. In this context, it was only in the late 2000s when entrepreneurship, development and innovation issues started to surface and materialize in the public policy agenda. However, since 2010, the Tajikistani authorities have started to assign an increasing priority to entrepreneurship and innovative development in their policy efforts. The large number of legislative and programmatic measures in these areas adopted in this period (Table 4) is a clear sign of these changing priorities.

Table 4. Key programmatic and legislative measures relating to Tajikistan’s NIS (chronological order)

Laws, programmes, resolutions	Implementing agency
State Programme for the Support and Development of Small Business in Republic of Tajikistan (1998)	
Law on the Academy of Sciences of Republic of Tajikistan (2002)	Academy of Sciences of Republic of Tajikistan (AoS)
Law on State Protection and Support to Entrepreneurship in Republic of Tajikistan (2002)	
National Development Strategy of the Republic of Tajikistan for the period until 2015 (2007)	
Law on Science and State Science and Technology Policy (1998, amended 2004, 2007, 2008, 2013)	
Law on Scientific and Technical Expertise (2009)	

Table 4. Key programmatic and legislative measures (continued)

Laws, programmes, resolutions	Implementing agency
Law on Technoparks (2010)	
Strategy of the Republic of Tajikistan in Science and Technology for the Years 2011-2015 (2010)	AoS (coordination)
Government Decree on Priority Research Areas in the Republic of Tajikistan for 2010-2012 (2010)	
Programme for Innovative Development of the Republic of Tajikistan for the period 2011-2020 (2011)	Ministry of Economic Development and Trade (METD) (programme management)
Concept of Entrepreneurship Development in the Republic of Tajikistan for the period up to 2015 (2011)	State Committee on Investment and State Property Management (SCISPM)
Law on Innovation Activity (2012)	METD, Ministry of Industry and New Technologies (MINT)
Programme for Human Capacity Development and Intellectual Property Rights for the period until 2020 (2012)	National Centre for Patents and Information (NCPI) at MEDT
National Strategy of Education Development of the Republic of Tajikistan until 2020 (2012)	Ministry of Education and Science (MES)
Programme of State Support to Entrepreneurship in the Republic of Tajikistan for 2012-2020 (2012)	
Government Decree on the Procedure of Organization and Evaluation of Innovation Projects Competitions (2013)	MEDT
(New) Law on the State Protection and Support of Entrepreneurship (2014)	Consultative Council on the Improvement of the Investment Climate (coordination)
Concept of Innovative Development of Agriculture in the Republic of Tajikistan (2014)	
National Strategy for the Development of Intellectual Property of the Republic of Tajikistan for 2014 - 2020 (2014) ¹	National Council for the Coordination and Development of Intellectual Property (coordination)
Government Decree on the State Institution "Entrepreneurship Support Fund" (2014)	Government of the Republic of Tajikistan (2015)
(Draft) National Development Strategy 2016-2030 (2015)	
(Draft) Strategy for the Innovative Development of the Republic of Tajikistan for the period until 2020 (2015)	Ministry of Economic Development and Trade (METD) (coordination)
(Draft) Law on Science and Technology (2015)	

¹ The Republic of Tajikistan has adopted several specialized laws on the protection of intellectual property (on copyright, on industrial design, on inventions, on trademarks and service marks, on geographical indications, etc., which are not listed in the above table.

Another systemic process of public policy choices and changes that can be traced in Table 4 is the evolving division of competencies and responsibilities among the various branches of government. Until 2010, most of the legislative and programmatic acts were adopted without

having a clear reference to their main implementing agency or agencies. The decisions regarding the responsibilities for the actual implementation were left to the discretion of the executive power, to be decided at a later phase. However, these practices began to change after 2010 when policy documents became more elaborate and included references to the responsibilities of concrete branches of government.

By 2015, it can be stated that the process of dividing competencies and responsibilities among public policy bodies is quite advanced in Tajikistan. This refers also to the functional responsibilities for the conduct of innovation-for-development policies.

The first legislative and policy support measures in the area of innovation-for-development were already undertaken by Tajikistan in the late 1990s and beginning of the 2000s. These included the State Programme for the Support and Development of Small Business (1998) followed by the Law on State Protection and Support to Entrepreneurship (2002). In retrospect, both acts can be seen as evidence that government policy recognized early on the role of entrepreneurship as a key driver of economic development in the context of Tajikistan. Another legislative act of this period was the Law on the Academy of Sciences of the Republic of Tajikistan (2002) which drew on the legacies of the past (a Soviet-type Academy of Sciences) but also tried to reflect the new conditions of independence and transition to a market economy and, hence, the need for restructuring.

The adoption of the National Development Strategy in 2007, with its horizon to the year 2015, was a turning point in the development policy efforts of the Tajikistani authorities. The 2007 National Development Strategy put forward specific targets in key development issues such as welfare, water supply, housing, sanitation, environmental sustainability and also highlighted the role of education and science as essential pre-conditions for fostering economic growth and achieving economic prosperity and well-being in Tajikistan. Importantly, the 2007 National Development Strategy was closely consulted with the donor community which pledged significant donor aid for its implementation.

The National Development Strategy became the key guiding economic policy document in Tajikistan and the subsequent legislative and policy efforts of the authorities became more coordinated and focused. The targets set in the Strategy became guiding principles for many of the institutional and structural reforms undertaken in Tajikistan in the following years. In particular, a number of important policy steps were undertaken in the promotion of science, technological development and innovation. Thus for the first time, Tajikistan adopted a Law on Innovation Activity (2012) which set out some guiding principles in organizing, managing and facilitating the innovative process in the country. Among other important legislative acts in this area, it is important to mention the Law on Science and State Science and Technology Policy (1998, with several subsequent amendments), the Law on Scientific and Technical Expertise (2009) and the Law on Technoparks (2010). A new and more comprehensive Law on State Protection and Support of Entrepreneurship was also adopted (2014). Thus, at present there exists an explicit legislative framework which reflects the current public policy stance on science and innovation activity. Notably, as also discussed in the subsequent chapters of the Review, this is only a very rudimentary policy framework; nevertheless, it is also a foundation on which subsequent policy efforts could be grounded.

One specificity of Tajikistan's legislative practice is that the laws as adopted by the national parliament, Majlisi Oli,²⁷ in most cases only regulate the basic framework conditions in the respective area while most of the implementation details are left to be regulated through by-laws and secondary legislation. Nevertheless, the latest legislative acts, and in particular the respective programmatic documents, contain more detail on the instructional infrastructure that supports their implementation. In this way, they have begun shaping the functional roles of the different public bodies in the conduct of innovation-for-development policies, as well as delineating functional roles and responsibilities.

Hence, the legislative activity of recent years was accompanied by the adoption of a range of national strategies and programmes (Table 4) which spelled out in greater detail the concrete national priorities and targets, the bodies assigned with responsibilities in the pursuit of these objectives, as well as the policy instruments and financial resources at their disposal.

It is also worth mentioning that the Programme for Innovative Development for 2011-2020 was the first to formulate the policy goal of establishing in Tajikistan a modern national innovation system which, it is envisaged, will be performed in two phases. The first phase is to focus on the setting up of the main building blocks of the system, while the second phase will focus on NIS upgrading and ensuring its efficient functioning. In the pursuit of this objective, the programme sets the task of establishing a regulatory and legal framework and the creation of innovation infrastructure that will stimulate R&D and innovative activity. The programme also targets a greater involvement of SMEs in innovation-for-development activities, the strengthening of linkages and cooperation between science and industry, as well as the promotion of international S&T cooperation.

To follow-up, the government adopted a range of policy measures targeting the development and protection of intellectual property (the Programme for Human Capacity Development and Intellectual Property Rights, 2012 and the National Strategy for the Development of Intellectual Property, 2014) and further support to entrepreneurship (among others, the Programme of State Support to Entrepreneurship, 2012 and a new Law on the State Protection and Support of Entrepreneurship, 2014).

At executive level, the functional responsibilities for the conduct of innovation-for-development policies in Tajikistan are at present divided between several public bodies. Innovation governance, which is implicit in the established institutional system and interactions between different bodies, is discussed below.

The Ministry of Economic Development and Trade of Tajikistan (METD) is the public body which is tasked with the greatest share of such functional responsibilities. While innovation is not explicitly mentioned in the ministry's terms-of-reference, the METD's mission statement includes a reference to its functional responsibility for the "coordination of monitoring and evaluating the implementation of national development strategies". Furthermore, a range of concrete responsibilities related to innovation were assigned to METD in some legislative and programmatic acts adopted by the Tajikistani authorities in recent years (Table 4). Thus, the Programme for the Innovative Development of the Republic of Tajikistan for the period 2011-

²⁷ Majlisi Oli comprises two chambers: the lower chamber with 65 members and upper chamber with 33 members (25 elected by deputies of local majlisi and eight appointed by the President). Both chambers have a five-year term.

2020 made an explicit reference to the central functional role of METD in the management and coordination of programme implementation.

The Ministry of Industry and New Technologies of Tajikistan (MINT) is also assigned with responsibilities related to the promotion of innovation and new technologies. MINT is a relatively new government structure (it was established in its present form in 2013), which integrated the functions of 16 previously-existing public bodies with responsibilities in different sectors of the economy. Among other things, MINT's terms-of-reference include responsibilities to "... conduct integrated state policy and legal regulation in... the development of new technologies."

The National Centre for Patents and Information (NCPI) is a separate unit under the line management of METD which is tasked with the protection of industrial intellectual property, including patenting and providing information support to the protection of intellectual property rights.

The Ministry of Education and Science of the Republic of Tajikistan is the central executive body tasked with policy and regulatory functions in the sphere of education and has some limited remit with respect to R&D undertaken in universities.

The Academy of Sciences of the Republic of Tajikistan (AoS) inherited the Academy of Sciences of the Tajik Soviet Republic. Its new role and functions in independent Tajikistan were only addressed in the Law on the Academy of Sciences adopted in 2002. According to the articles of this law, AoS is tasked with the identification, in consultation with other relevant public bodies, of the national science and technology policy priorities and the organization and coordination of fundamental and applied research in these areas. Apart from the AoS, in Tajikistan there are "sectoral" academies such as the Academy of Medical Sciences, Academy of Agricultural Sciences and Academy of Education dating from the Soviet era and having a limited policy and coordination role in the national R&D system.

Most of the R&D activities in Tajikistan are undertaken by the institutes under the auspices of AoS, which has more than 20 research institutes as well as sectoral academies. In addition, there are a small number of sectoral research institutes which are also a legacy of the Soviet past.²⁸ As regards higher education, Tajikistan has 30 universities with more than 150,000 students. Some of the more advanced universities also have research departments (which offer R&D services to companies and also compete for government grants in response to the announced government research priorities), but in most cases, universities are mostly engaged in teaching while R&D accounts for a marginal share of their activities.

Tajikistan's banking sector consists of 16 commercial banks and some 120 microcredit institutions (including depository organizations and funds). The banking sector is dominated by four large banks (one of which is state-owned) that account for some three-quarters of the total assets of the banking system. Financial intermediation is limited (credit to the private

²⁸ For an overview of Tajikistan's R&D system, see Country Report Tajikistan. In Sonnenburg, J., Bonas, G. and Schuch, K. (eds.) (2012): White Paper on opportunities and challenges in view of enhancing EU cooperation with Eastern Europe, Central Asia and South Caucasus in Science, Research and Innovation. Prepared under the FP7 INCO-NET EECA Project, International Centre for Black Sea Studies, Athens. ANNEX I – Country Reports.

sector amounts to some 12-13% of GDP), and the local financial system is not well integrated into global financial markets. The level of dollarization of the local economy is very high (some 80% of all deposits and 70% of credit). While many of the banks are in private ownership, corporate governance is generally weak and there are signs of government interference in bank practice (equivalent to directed lending).

Against this background, Tajikistan has a relatively well-developed microcredit system which encompasses both the commercial banks and a network of specialized microcredit institutions.²⁹ As of the end of 2014, microcredit accounted for 24% of all outstanding banking credit in Tajikistan. Notably, the quality of microcredit portfolios was also superior to that of credit in general, and while at the beginning of 2015, 27% of all loans extended by commercial banks in Tajikistan were classified as substandard or non-performing, the respective share of microcredit was just 3.6%.

Tajikistan has also established some development-support institutions. The State Committee on Investment and State Property Management (SCISPM) is tasked with some important functions in this area, such as the improvement of the investment climate in the country and the support of entrepreneurship. SCISPM is also the central public body responsible for aid coordination; facilitating partnerships between public authorities, donors and investors.

The Fund for Support of Entrepreneurship is an example of a relatively well-functioning public development support institution. It was established as an executive agency which was initially under the line management of SCISPM but as of the beginning of 2015 its line management has been transferred directly to the Tajikistani government.

An important economic and investment forum, “Entrepreneurship - The Engine of the Economy”, took place in Dushanbe in October 2014 under the patronage of the President of the Republic of Tajikistan which was an indicator of the great importance that the authorities assign to the support of entrepreneurship.

At the time of writing this Review, work was underway on some important new policy and programmatic documents (Table 4). A new National Development Strategy 2016-2030 is expected to set the key strategic development goals of the country and, correspondingly, the strategic orientation of national policy over the next 15 years. In parallel, the authorities are already working on a new Strategy for the Innovative Development of the Republic of Tajikistan until 2020. This programmatic document is expected to set concrete development targets for the next five years and spell out the next steps in building and strengthening the NIS, as well as the policy instruments that are expected to be used in the pursuit of these objectives. A new Law on Science and Technology is also being discussed.

Innovation governance

Innovation governance refers to the interrelated, multi-level management efforts of various innovation stakeholders and actors.³⁰ This generic understanding of innovation governance

²⁹ As defined by the National Bank of Tajikistan, microcredit should not exceed 250,000 somoni for individuals and 400,000 somoni for legal entities (National Bank of Tajikistan Instruction No. 197 “*On the procedures for regulating the activities of microcredit organizations*” - http://www.nbt.tj/files/Instruction/Ins_197_en.pdf).

³⁰ Governance of Innovation Systems, volumes 1, 2 and 3, Paris: OECD, 2005.

fully applies also when, as in the case of Tajikistan, one considers innovation in the broader sense of “innovation-for-development”.

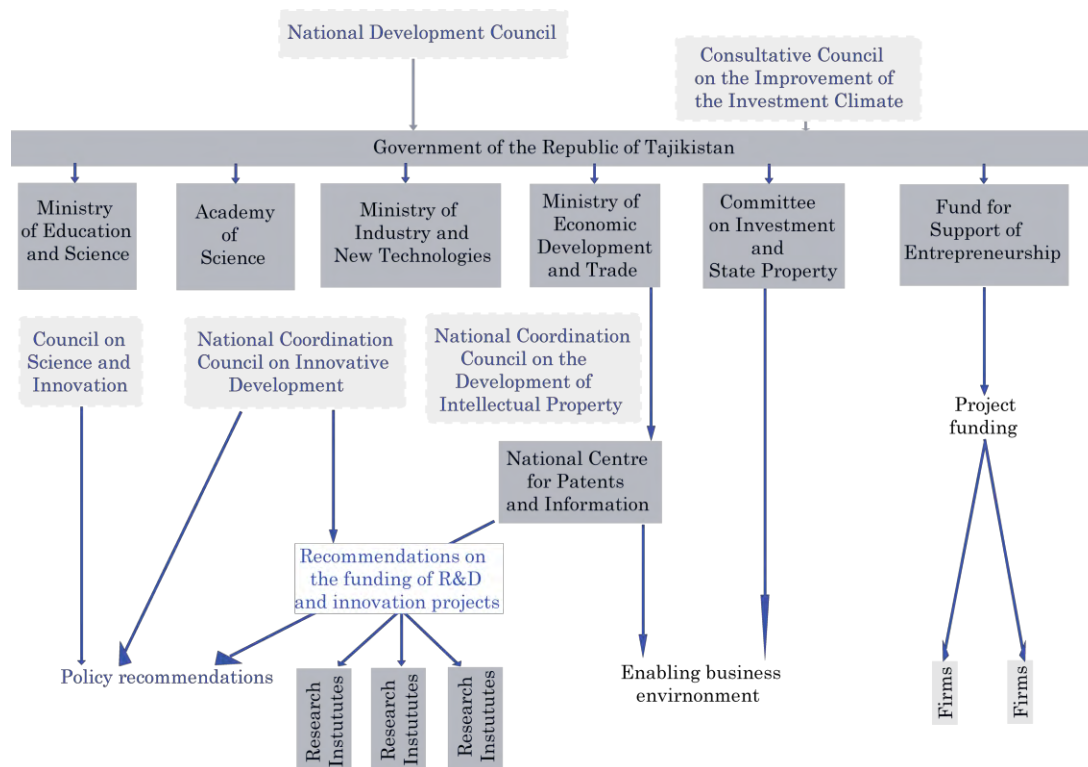
Innovation governance includes both the decision-making rules and interactions between innovation stakeholders taking such decisions which may, in turn, feedback into decision-making processes. From this perspective, innovation governance has both a formal component related to existing legislation, regulations and other policy decisions and an informal or behavioral component which is related to the incentives and motivation of NIS stakeholders and actors. Innovation governance includes both public sector (relevant government bodies) and private sector actors (businesses, financial institutions, innovation intermediaries, etc.) whose behaviour is driven by very different incentives and motivation. The analysis of innovation governance in a national context must take into account the characteristics of the governance system and processes.

One specific public sector function in innovation governance is the coordination of policy design and implementation. The need for this arises from the nature of innovation policy which – in the context of NIS and the modern innovation process – is a largely horizontal policy addressing many actors at a similar level of governance. This means high-level policy decisions may need to be implemented by different ministries and public bodies at the same or at a similar level of subordination within the public administration. There may also be a need for coordination among numerous lower level bodies (e.g. agencies or departments) that are subordinated to different ministries.

Coordination to facilitate efficient functioning of cross-border NIS linkages is an aspect of innovation governance that is of particular importance to small, open economies. While in large economies it is possible to complete most coordination loops within national boundaries, this may not be feasible in those with small markets that may also have a skewed structure. Policy coordination should therefore also address cross-border aspects.

A key prerequisite for both coherent policy design and coordination is an agreed long-term national vision of the directions of economic and technological development and related national priorities. The effectiveness of policy coordination also depends on the design of overarching elements of innovation policymaking, and on the existence of efficient linkages within the NIS to enable interactions among them.

Drawing on these more general considerations, Figure 7 presents the main components of the innovation governance system in Tajikistan.

Figure 7. Main components of the innovation governance system in Tajikistan


At the top of the governance system are two high-level Councils which are under the President of the Republic of Tajikistan. The National Development Council is an advisory body which was set up to facilitate the coordination between state institutions, the private sector and civil society on the implementation of the National Development Strategy of the Republic of Tajikistan. The National Development Council oversees the implementation of development programmes and formulates recommendations on the development strategies of the country. The Consultative Council on the Improvement of the Investment Climate under the President is tasked with the coordination of work by the state administration relating to the improvement of the business climate and increasing investment activity in the country, based on a dialogue between the state and the business sector.

The most important among the coordination councils at policy implementation level is the National Expert Coordination Council on Innovative Development which is headed by the First Deputy Minister of MEDT and includes Deputy Ministers from several ministries as well as representatives of the AoS and universities. MEDT is also tasked with administering the functioning of this council. The National Coordination Council on Innovative Development was established as a governance framework of the Programme for Innovative Development, 2011-2020 and one of its main tasks is the coordination of the implementation of this programme. Among its other important functions is the joint inter-agency evaluation of R&D and innovation project proposals, and the formulation of recommendations regarding their funding (the final funding decision being taken in the context of the adoption of the government budget).

The National Coordination Council on the Development of Intellectual Property is a body that coordinates the respective actions of public bodies, local authorities and other organizations and institutions with a view to implementing a unified state policy in the field of intellectual property. It can also initiate draft policy recommendations for improvements to the protection of intellectual property in Tajikistan. This council also coordinates the implementation of the National Strategy for the Development of Intellectual Property, 2014 – 2020.

The Council on Science and Innovation is to be established under the Ministry of Education and Science with the participation of representatives of higher education institutions, the focus of which is S&T policy in the academic sphere.

Apart from the public agencies and coordination bodies as depicted in Figure 7, it is worth mentioning some non-governmental structures that have a say in the overall governance process. The Development Coordination Council is an informal association of international donors and donor organizations that are active in Tajikistan. It coordinates donor activities structured in several clusters, such as: natural resources, food security and nutrition, infrastructure, human development, governance, economic and private sector development. As donor aid plays a significant role in Tajikistan's development efforts, the Development Coordination Council is a key partner of the government in the implementation of the country's National Development Strategy.

The Aga Khan Development Network has been operating in Tajikistan since 1992 and provides development and technical assistance in areas such as education, rural development, financial services, healthcare, and cultural revitalization.

A range of other non-governmental bodies such as the Chamber of Commerce and Industry of the Republic of Tajikistan, the National Association of Small and Medium Business, the National Association of Business Women of Tajikistan, the Association of Microfinance Organizations of Tajikistan and others can also be regarded as part of the innovation governance system as their operations contribute to establishing linkages and the coordination of efforts of stakeholders that are part of innovation-for-development processes.

There are several specific general features of Tajikistan's innovation governance system. One such interesting aspect is the important role of coordinating cross-sectoral consultative bodies at different levels of governance: at the top strategic and policy-formation level and at intermediate policy implementation level. De facto, the innovation governance system is a balanced combination of public bodies (Ministries, State Committees and agencies) and the coordination councils that seek to synchronize the functioning of these bodies. In the main, the governance system is almost entirely dominated by public bodies which are tasked with policy-formation and implementation. As noted, there are some non-governmental institutions also performing limited governance functions but these play only a minor role.

Another distinct feature (that can also be traced in Figure 7) is that all governance bodies are assigned limited autonomy in policy implementation. In reality, these bodies are not empowered with the responsibilities to pursue the chosen policy line through decentralized funded policy instruments under their control. With the exception of the project-support activities of the Fund for Support of Entrepreneurship, decentralized policy instruments are virtually non-existent in Tajikistan. While there is considerable inter-agency coordination in

policy-making and implementation, all major funding decisions are taken at government level and funding is channeled through its budget and that of the Ministry of Finance.

2.3 Challenges and opportunities

Tajikistan is faced with considerable challenges related to the combination of being a lower-middle-income country with an unfavourable geographic location. In principle, the limited domestic market makes the case for pursuing an export-led development strategy. However, Tajikistan is land-locked, remote from most major markets, and has uneasy relations with some of its neighbours. All these factors significantly increase transport costs and hence question the rationale of export-oriented strategies. At the same time, from the perspective of the domestic market, the geo-political position also raises the cost of imports and so this can also be regarded as an opportunity since import substitution is attractive. However, the small domestic market and weak competition in itself is an impediment to import substitution strategies, as these conditions are not conducive to establishing efficient production lines benefiting from economies of scale.

In the context of these intertwined geo-political factors, there is probably room for the pursuit of a variety of selective sectoral development policies based on solid business cases, which in some sectors and industries target export orientation while in others result in import substitution.

As already discussed, the observed specialization of the Tajikistani economy is a development challenge but at the same time offers broad opportunities for pursuing innovation-for-development policies within the country. In such conditions, most entrepreneurial ventures seeking to broaden the nation's specialization (be they export-oriented or of the import substitution type), will at the same time be innovation-for-development (in the broad sense) ventures. Thus, if the above-mentioned selective sectoral development policies are successful, they will at the same time be accompanied by intensive innovation activity.

Addressing the issue of the limited domestic market might also require specific policy approaches. Obviously, this limitation will remain as a major constraint in some industries (such as those involving modern mass production), but will not necessarily be an impediment in others, such as agriculture and related processing industries and services. Selective sectoral development policies in this case can pursue the establishment of sustainable virtuous cycles targeting the introduction of products new to the local market or substituting imports. Such cycles place new suppliers and consumers into a self-propelling loop whereby supply breeds new/more demand and demand breeds new/more supply through positive feedback. When such a supply-demand chain involves new products (as the majority could be expected to), it also involves innovation processes. The role of policy is to establish an environment conducive for such innovation-for-development cycles to emerge and then be sustainable.

The concept of self-propelling virtuous cycles in the domestic market bears some resemblance to the notion of firm-level “islands of excellence” which can become the new engines of employment and growth in a country like Tajikistan. Besides, virtuous supply-demand cycles which are closed in the domestic market will benefit, up to a point, from the low competitive pressure coming from abroad. They will have a window of opportunity, probably measured by years or even decades, during which they can grow and strengthen and thus be prepared to face stronger competitive pressures in later phases.

The age structure of the Tajikistani population is also both a challenge and development opportunity for the country. Undoubtedly, it generates enormous strain for the education system and other social structures but at the same time is a potential source of vibrant growth in the future. For this to happen, however, policies must be in place that provide young people with knowledge and skills, but also with entrepreneurial awareness-raising and training in order to unleash their entrepreneurial spirit and potential. It is Tajik's youth that can serve as the driving force for the implementation of selective sectoral development policies as described above, and in the establishment of virtuous supply-demand cycles.

Policies to support innovation-for-development should also rely on local initiatives. International experience shows that bottom-up initiatives generated by locals – who know best the local environment and context as well as existing needs; potential market niches and production opportunities – are the most successful. Therefore, policy should aim at establishing an environment conducive for communities to identify and prioritize their own needs, come up with initiatives and support the engagement of key local stakeholders in their implementation. In a way, policies facilitating entrepreneurial discovery by local entrepreneurs are close in spirit to what came to be termed “smart specialization” policies.

Another challenge and opportunity of a general nature is the large number of absent migrant workers. On the one hand, their leaving temporarily deprives the local economy of a major resource; on the other hand, working abroad is an opportunity to acquire new skills, including entrepreneurial skills that can later be applied domestically when the conditions are ripe. They are also a source of remittances which are a significant balance-of-payments support to the Tajikistani economy and provide livelihoods for their families. The migrant cohort can thus also be a specific target of Tajik's innovation-for-development policies.

In recent years, Tajikistan has made considerable progress in the institutional build-up of an emerging economy; this notwithstanding, its NIS is still at a very early stage of development. When comparing the existing institutional and governance structures in Tajikistan with the desired composition of a well-functioning NIS, there are a number of building blocks that are still missing or are only at the embryonic stage.

On the positive side, Tajikistan has an efficient government supported by reasonably well-structured public institutions. The legislative process in the country follows established rules and procedures. The government has invested considerable effort in increasing the transparency of its function, in particular by providing public information on its operations and public access to related documents. The combination of the workings of public administrative bodies (ministries, agencies) and coordination councils at different levels is a good practice that merits commendation.

At the same time, there is significant room for further reform efforts towards the establishment of a well-functioning NIS. What is observed in a mature national innovation system is a vibrant ongoing pipeline of innovation projects and processes including a massive flow of spontaneous bottom-up initiatives generated by innovative entrepreneurs. In turn, such innovation activity, which involves the interactions and collaboration by many innovation stakeholders, only takes place in a conducive environment. As discussed in section 2.2, a well-functioning NIS implies both the presence of key building blocks but also good

connectivity and efficient linkages among innovation stakeholders. Both supply and demand for innovation are key factors for a vibrant innovation activity.

Tajikistan's innovation and entrepreneurial scene are still far from such a performance. There are many factors and reasons for this, including the absence of important building blocks in the NIS, poor connectivity among stakeholders, the lack of incentives, low demand for innovation, the absence of relevant policies and policy instruments in place. In line with the methodological principles outlined in section 2.2, this Review seeks to focus on what is seen as the most critical challenges in the NIS and, correspondingly, suggest measures that will have the most significant and immediate effect in terms of innovation-for-development.

As regards the main components of Tajikistan's NIS, one of the key problems seems to be the absence of a satisfactory infrastructure of support institutions and intermediaries that could facilitate the market uptake of innovative ideas and entrepreneurial projects in general. Such agents, which are highly indispensable for innovative projects to be brought to successful completion, are practically absent in Tajikistan or only exist in rudimentary form. Naturally, this gap is not easy to fill and the building of such infrastructure in itself will be a long-term process which requires a continued and dedicated policy support effort from the government. In doing so, it is important to set the sequencing right as the demand for some components of this infrastructure will probably only emerge in later phases. For this reason, it is worth focusing on support institutions that will respond to already-existing demand that will be likely to produce immediate effect.

One such example is the family of entrepreneurship and business support institutions. While the activity of the State Fund for Support to Entrepreneurship is in itself an example of good practice, on the whole the outreach of public support to entrepreneurs remains very limited. This is an area with significant potential for further expansion; moreover, national efforts in this direction are likely to attract the attention of (and hence technical and financial support from) international donors. Tajikistan's future efforts in this area can also build on the positive experience of promoting micro-finance. In terms of its development effect, a more efficient way to use limited financial resources is to reach out with support to a greater number of would-be entrepreneurs then allocate the same resources to the support of a limited number of large-scale projects.

Such a concept amounts to the design and implementation of a mass-scale entrepreneurship support scheme based on the low availability of micro-credit. Plus, it can be applied to all economic sectors and activities and not just manufacturing projects as the State Fund for Support to Entrepreneurship. Micro-finance at preferential terms would be well-suited to support entrepreneurs in agriculture but also University start-ups and/or spin-offs. Young people could be specific targets of such micro-finance-based entrepreneurship support schemes as one of the instruments to enhance their entrepreneurial spirit. In addition to finance, these support schemes should provide a full range of information and consultancy services to would-be entrepreneurs, including awareness-raising, management-training, business support services, support to networking and the like.

In effect, through its wide outreach, a mass-scale entrepreneurship support scheme could serve as catalyst for the emergence of new engines of growth for the economy and the materialization of the abovementioned self-propelling virtuous circles. Related to that, more attention must be allocated to entrepreneurship support in higher education institutions,

something that is virtually non-existent at present. In the few cases where universities have some form of technology transfer services, these offices mostly deal with the support of contractual services by universities to industry, but not with the support of entrepreneurial ventures generated within the university. While the establishment of fully-fledged technology transfer university offices is a task of its own merit, what is even more important is the support of in-house entrepreneurship and its first steps in the form of university start-ups and spin-offs. This reform line could easily be linked with the micro-finance-based entrepreneurship support schemes as described above.

As regards the innovation-for-development policy domain, Tajikistan has made a very good start at the strategic level with the adoption of a range of long-term programmatic documents (Table 4) which outline the main directions that the country will be pursuing in the foreseeable future. However, when it comes to the operational level of specific innovation-for-development policy instruments, the country is still at the initial phase of a long process. Also in this domain, there is a need for a proper sequencing of policy reform efforts in order to achieve the most and if possible, at a fast rate, within the limited available financial resources.

Following the arguments and opportunities outlined above, the biggest gap in this area is the availability of seed and early stage financing. While early stage financing is a problem in all environments, it should be pointed out that in Tajikistan this area is just a blank spot on the map. Plus, it is difficult to expect that private institutions like business angels and venture capital firms – those who do provide such finance in mature economies – are likely to emerge in Tajikistan any time soon. But without support from such sources most, if not all, innovative entrepreneurial ventures are unlikely to get off the ground and cross the so-called “Valley of Death”. One possible fast-track approach would be to design and establish some publicly-supported institutions that would emulate the operations of private business angels and/or venture capital first. This would be a temporary step until proper private business angels and venture capital begin emerging in Tajikistan.

The most important specific feature of these institutions – which distinguishes them from micro-credit institutions – is that they would extend non-debt finance to entrepreneurs in different forms (grants, equity finance, future options, etc.). The operations of such seed and early stage financing institutions can easily be coordinated with those of micro-finance-based entrepreneurship support schemes and the support to university in-house entrepreneurship as described above. Thus, these three steps can be regarded as parts of one bigger reform package.

What concerns the support of technological innovation is that the policy instruments which are in place in Tajikistan are both outdated and limited in scope. Grant funding of research is only starting to develop in the country. The very limited public support for science and R&D practically flows through the traditional channels of budgetary funding of R&D institutions. There are elements of quasi-grant funding with R&D institutions extending competitive bids for the funding of their projects but in the end funding for the winning projects is transferred as core institutional support. The fact that certain projects are selected as winners only defines the direction of research undertaken by the respective R&D institute on the basis of their core funding. Project funding of innovation-for-development projects is practically non-existent in its contemporary form. As already noted, private sources of risk-project finance do not exist either.

In more mature market economies, the direct full budgetary funding of research institutions (rather than research projects), has largely been abandoned as it was recognized that such schemes do not create sufficient incentives for research and innovation. In addition, they are somewhat inept in the administrative sense and lengthy to implement and operate. Therefore, steps in this area could target a gradual reorganization and restructuring of the system of R&D funding towards that of project funding. Funding should be in the form of grants which will be allocated on a competitive principle through open calls. Such a reorganization of the funding of R&D institutions would imply that part of the funding received through state budgets would be channelled into a special research fund which manages open calls, the evaluation of bids and the allocation of funding. R&D institutes would receive reduced amounts of basic funding and would therefore have much higher incentives to participate in open calls with competitive bids.

Such funded projects should cover the whole innovation cycle from research to market in the form of new products and services. Funding a complete cycle, rather than breaking it into separate funded phases, is the best guarantee that the final outcome will indeed reach the market. In addition, project funding should contribute to the further building and strengthening of the NIS, more specifically by supporting linkages and collaboration among stakeholders. This can be achieved by making funding conditional on the establishment, prior to the project's start, of such collaborative linkages (e.g. between R&D and academic institutions, on the one side, and industry, on the other). In view of the narrow economic specialization of Tajikistan, these schemes could also encourage the establishment of cross-border industry-science linkages.

Even in such a limited scope, undertaking such reform measures would require significant, for the size of Tajikistan's economy, financial resources. Some could be started by internal re-allocation of existing public finance resources, but in any case, the implementation of an ambitious reform agenda would be more efficient if more resources could be mobilized for this purpose.

However, the situation with finance in Tajikistan is not easy. There is no local development bank; apart from the commercial banking sector, the local capital market is practically non-existent and alternative funding opportunities do not exist. Therefore, Tajikistan could plan a targeted approach to international donors with a very concretely-formulated reform programme that clearly spells the planned reforms, their objectives and expected concrete outcomes, their timeline and the necessary funding for implementation.

2.4 Recommendations

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 the 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 being goods and services that are new to the local market;
- Based on this policy synchronization, to identify areas of interaction between 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 to the relevant bodies 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 approval 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 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 various industrial policy objectives across sectors (export orientation, import substitution, autonomous deepening of the local market or a neutral stance).*

Chapter 3

FRAMEWORK CONDITIONS, INNOVATION POLICIES AND INSTRUMENTS

3.1 Framework conditions for innovation

General business environment

The business environment in Tajikistan has made some progress in recent years, for instance, regarding procedures for starting a business or the introduction of an electronic system for filing and paying taxes, but on the whole innovation activities and technological development remain weak. The most recent Enterprise Surveys carried out by the World Bank and the International Finance Corporation shows that the country's innovative capability³¹ is below the average of all Eastern European and Central Asian countries (used as a benchmark group). R&D expenditures are quite low, with R&D intensities since 2004 remaining under 0.1% of GDP, which is very low compared to Russia (1.1% in 2013), Ukraine (0.65% in 2011), Armenia (0.66% in 2011) or Belarus (0.8% in 2011)³². The share of industry on GDP is also quite low. Many companies are state-owned, particularly in the energy sector as well as the aluminum, cement, and cotton industries.

Due to low R&D expenditure, innovative potentials remain underdeveloped. Most companies are acquiring foreign equipment and technologies and adapting them to fit their needs. Inventing technologies or innovations by themselves is rather the exception. Most companies remain at a quite low technological level. Current legislation pursues the goal of deregulation and simplification of technological imports (e.g. importing companies benefit in the form of tax reductions). Another problem is the lack of qualified specialists.

The World Bank Economic Report for Tajikistan (2014) suggests that the whole value-chain of agro-processing, including storage, holds the most promise for development in terms of potential scale of impact and numbers in employment along with textiles and clothing. A national and regional strategy for agro-processing would help guide the development of the sector.

In general, the Business Environment and Enterprise Performance Survey 2012-13 (BEEPS) indicated for Tajikistan that the top three business environment obstacles faced by Tajikistan enterprises are not directly linked to innovation. The three most important obstacles were identified as electricity, access to finance and practices of competitors in the informal sector. Political instability, tax administration, corruption and workforce skills were cited as the next four obstacles. In the Transition Report 2014, the European Bank for Reconstruction and Development came to the conclusion that there are significant administrative barriers to

³¹ Two indicators to measure innovative capability were used in the report: Share of firms obtaining international quality certifications (which can open doors to technology and innovation) and use of ICT (share of firms using the Internet; share of firms using email to communicate with clients and suppliers).

³² UNESCO Database; OECD Main Science and Technology Indicators.

establishing new enterprises, and the dominance of enterprises owned by politically-exposed persons is hindering new entrants and the growth of SMEs in the private sector.

Entrepreneurship/Innovation culture

The entrepreneurial culture in Tajikistan has improved since 2008 as the government has made some progress with regards to eliminating unnecessary procedures, lowering minimum capital requirements, and establishing a one-stop shop. Furthermore, changes have been made to the insolvency law, the protection of minority shareholder rights, income tax rates have been lowered and a new law passed for the creation of a credit bureau (see The World Bank Tajikistan Partnership Programme Snapshot 2014). In 2014, the country improved the business start-up process by enabling the Statistics Agency to issue a statistics code for new businesses at the time of registration.

Despite these positive trends, over-regulation and bureaucratic burdens effecting business operation and entrepreneurship are still major hindrances. Tajikistan ranked 106th globally (from 189) and 26th regionally for ease of doing business in the World Bank Doing Business 2015 report. For comparison, Belarus ranks 40th globally, Kazakhstan 55th, the Kyrgyz Republic 9th, Russia 34th and Ukraine 76th. Starting a business in Tajikistan requires four procedures, takes 39 days and costs 23.3% of income per capita. In the Kyrgyz Republic it requires two procedures, takes eight days and costs 2.4% of income per capita. Other indicators, like dealing with construction permits, where Tajikistan ranks 168th, getting electricity (178th), registering property (70th), obtaining credit (116th), paying taxes (169th) or trading across borders (188th), also point to issues which leave room for improvement.

Summing up, the general institutional and cultural environment for entrepreneurial activities to flourish is weak, resulting in low start-up intensity and limited innovation activities. Further challenges regarding entrepreneurship activities are observable in the science sector where incentives to commercialize ideas from research projects are limited, if they exist at all. Therefore, and in sharp contrast to many other countries, innovation activities in Tajikistan happen primarily with existing companies rather than new entrants.

Human Capital/Education

One of the key input factors for an innovation system is a well-educated labour force. The Government of Tajikistan has recognized the importance of education and human capital for both the economy and society as a whole. Thus, the current National Strategy of Education Development puts emphasis on the inclusion of basic vocational training components and on management and business in educational programmes. Furthermore, secondary and higher vocational training should be improved in accordance with labour market demands or the requirements of the economy. Prior to the current education strategy, the government prepared key legislation to regulate state policy on education between 2000 and 2009. This legislation aimed to provide equity in access to education, lower gender bias, improve overall quality and alleviate poverty by encouraging people to seek a better education. Over the past five years, the government has adopted ten state education programmes, five national education plans and a number of projects to be implemented in the next five to ten years.

However, the UNDP in its 2014 Human Development Report ranks the human development of Tajikistan as 133th of 177 countries, with a Human Development Index of 0.607, the lowest

in Central Asia and the CEE/CIS region. According to UNDP's classification, Tajikistan belongs to the group of "medium human development". Its total expenditure on education in 2012 makes up 3.9% of its GDP, up from 2000 - at which time it spent 2.3%. Compared with all countries belonging to the group of medium human development, Tajikistan is slightly above the average value of 3.7%. However, the level of spending, which is about half of the OECD average expenditure of approximately 6%, is severely inadequate to meet the requirements of Tajikistan's high-needs education system. Against this background, it can be stated that with regard to the business sector and its ambition to innovate, the provision of a well-educated or qualified labour force is currently among the main challenges.

IPR regime

Since 2014, the Republic of Tajikistan has established a national strategy for the development of intellectual property (IP) which gives tangible form to the current state and further development of the national IP system, its goals, objectives and specific measures. The main challenges in the area of IP are, among others, the violation of copyright and related rights, the lack of inventors and owners of IP to protect their rights, insufficient use by SMEs of IP as a tool for competitiveness and a low level of awareness of IP issues. The main implementing authority of the strategy is the National Centre for Patents & Information (NCPI). Its tasks are to protect the public interest in the fields of invention, industrial design, trademarks and service marks. Concrete activities focus on the following issues: awareness-raising (publications, conducting studies on IP issues), publishing of standards for IP, establishing centres for commercialization in all the country's universities, and infrastructural improvement. One of the most important current activities is to facilitate access to the instruments related to IP offered by the NCPI. In recent years, approximately 50 different inventions annually have been registered with the NCPI.

3.2 Legal framework for innovation and innovation strategy

For the Republic of Tajikistan, innovation policy and the development of a respective regulatory framework is a relatively recent undertaking. Most of the laws, government resolutions, judgments and decrees have been approved in the period since 2010. Until then, the *National Development Strategy for the period to 2015* (NDS15), which was initiated by the President, was the main guiding document. The NDS15 is mainly focused on achieving sustainable growth, expanding public access to basic social services and reducing poverty. Thus, the NDS15 is not so much an innovation strategy as a comprehensive social and economic development strategy. Innovation is not regarded as a distinct national priority. However, the description of the core problems of the "production block", the respective development priorities and the stipulated key areas of activity address the need to improve framework conditions which are equally – but not exclusively - conducive for innovation (e.g. public infrastructure services, laws on competition, property ownership, general investment climate, education, entrepreneurship). With a view to specific industries or sectors, the NDS15 prioritizes public services (water, electricity), agriculture, mining and telecommunications, the aluminum, cotton and food industries and light-industry. Together with the presentation of priorities for developing the education and science systems, the NDS15 constitutes the main document for the development and approval of further legislation.

Beginning in 2010, the main legislative measures related to science, technology and innovation include the following:

- Law on Technology Park (July 08, 2010);
- Programme on innovative development of the Republic of Tajikistan for 2011-2020 (April 30, 2011);
- Law on Innovation Activity (April 16, 2012);
- Programme of state support for entrepreneurship in the Republic of Tajikistan for 2012-2020 (April 30, 2012);
- National Strategy of Education Development of the Republic of Tajikistan until 2020 (June 30, 2012);
- Law on Science, State Science and Technology Policy (amended on December 28, 2013);
- The concept of innovation development in agriculture of the Republic of Tajikistan (March 3, 2014);
- National strategy on the development of intellectual property in the Republic of Tajikistan (June 03, 2014).

Additionally, the government has approved a state programme on the support and development of small business (1998), and laws on: copyright and related rights (2014); state protection and business support; public procurement of goods, works and services (2006). Additionally, it has sanctioned different complementary resolutions/judgments in the field of innovation support³³. A strategy of innovative development for the period until 2020 was drafted in 2014, but due to the current elaboration of the innovation performance review, the approval of the strategy and the further process has been paused.

Legal framework

On the basis of the legislative measures listed above, this section briefly summarizes the main strategic approaches, objectives and implementation procedures of each law, concept, strategy or programme. Thereafter, a short assessment will be given.

The *Law on Technology Park* specifies the infrastructure concepts of an innovation and technology park, a science park, a Technopolis,³⁴ and a technology/business incubator. The main emphasis of the concepts is the implementation of high-quality technologies, the development of innovation, SMEs, the transfer of science into production, the cooperation with institutions in the area of vocational training, education and research, the establishment of international relations in the area of innovation, the attraction of students and the creation

³³ Including the following resolutions/judgments: "Procedure for collection and disposal of information in the field of innovation and intellectual property in the joint Internet portal", "Procedure of state registration of the organization, examination and competition of innovative projects", "Regulation of the National Council for the coordination and development of the sphere of intellectual property".

³⁴ The original concept of Technopolis was developed in 1983 by the Japanese Ministry of International Trade and Industry (MITI) to support regional development by high-technology and manufacturing industries. The respective law resulted in a special programme with the aim to establish technology parks for regional development and location of high-tech industries in structurally weak regions. According to the Law on Technology Park of Tajikistan, a Technopolis is the territory in which Innovation and Technology Parks and Science Parks operate.

of new jobs. Furthermore, the law specifies aspects like the registration of such parks, supervision, conducting of examinations, international cooperation, etc. Technology and science parks are considered – under current framework conditions – important actors within innovation systems, so the law is a good starting point with a view to establishing infrastructure for innovation. However, until now the law remains in a “theoretical” status as due to a lack of funds implementation is still pending and the technology parks or similar models are not yet operating.

The *Programme on Innovative Development* (approved in 2011) refers to a number of laws and regulations (primarily in the field of science) since 1998. The overall objective of the programme is the development of legislative and regulatory acts with regard to economic and organizational measures which support innovations. Against this background, the programme puts emphasis on a) the development and implementation of innovative projects, b) the establishment of an innovation infrastructure, c) the development and improvement of training systems for experts in the field of innovations, d) the establishment of an information system, and e) increasing international cooperation in the field of innovation. The programme defines the following strategic goals:

- Establishment of an effective innovation system which promotes technological competitiveness and innovative products with relevance for domestic and foreign markets;
- Substitution of imports by domestic products and technologies;
- Acceleration of socio-economic development and achievement of national strategic goals (e.g. rational use of natural resources and raw materials, investments to achieve economic development, energy, food and environmental safety, increased welfare and quality of life).

The main tasks to achieve these goals are:

- Promotion of scientific, technical and innovative activities;
- Formation of regulatory and legal framework conditions for innovation activities;
- Involvement (and effective use) of the country’s scientific and technological potential in innovation processes;
- Transfer of research results into economic turnover and commercialization of science results;
- Establishment of an innovative infrastructure;
- Financial support for the implementation of the programme.

In addition to ten priority scientific fields (e.g. nanotechnologies, metallic materials, polymer composite materials, renewable energy sources, biotechnology, biomedical technologies, etc.), the programme refers to the following industries/sectors which are crucial for Tajikistan’s further development:

- Education and health;
- Energy and industrial complexes;
- Agro-industrial complex.

In addition to the goals, tasks and priority sectoral and scientific fields, the programme contains information on general and specific challenges of Tajikistan, implementing authorities, implementation phases, financial support of the programme (funding sources), programme management and a list of concrete projects planned for implementation in the period 2011-2020. However, information on the status of these projects and the implementation of the other measures stipulated in the programme remains incomplete. One such example is the Ministry of Industry and New Technology which does not have funds for activities in the area of science and innovation. Furthermore, since the establishment of this Ministry no funds have been allocated to the development of the industry sector.

The programme is certainly a cooperative and coordinated approach with many public authorities involved (e.g. Ministry of Science, Ministry of Education, Ministry of Industry and New Technologies, Ministry of Economic Development and Trade, Academy of Sciences, Academy of Health, Academy of Agriculture). The drafting of the programme was carried out by the interdepartmental commission.

The Law on Innovation Activity from 2012 is a quite general (and short) document beginning with some basic definitions (of innovation, related concepts, types and objects of innovation) and the principles of national innovation policy. Article 10 of the law specifies the main objectives of state innovation policy as follows:

- Creation of favourable socio-economic, organizational and legal conditions in order to improve production efficiency by practicing innovative capacity, energy-saving and environmentally-friendly activities in terms of technology, promoting the production of competitive products;
- Formation of the legal and regulatory framework to ensure the development of innovation and protection of the interests of subjects and innovation;
- State support for innovation and the formation of innovation infrastructure;
- Involvement of SMEs to innovate;
- Ensuring cooperation between science and industry;
- Promoting international cooperation in the field of innovation, the protection of national interests and intellectual property;
- Attracting investment banks, other financial institutions and private investment to support innovation; and
- Promote a system of training, retraining and advanced training of specialists in the field of innovation.

Concrete instruments to achieve these objectives are presented in Article 13 and are quite general (funding of research, promote the development of enterprises, provision of specialized advisory services, funding of training, public procurement, etc.).

The Programme of State Support for Entrepreneurship for 2012-2020, approved in 2012, is a series of long-term measures to create favourable conditions for the establishment of business activities, including the modernization of production and technological processes, attracting foreign and domestic investment, strengthening public-private partnerships, improving the financing systems related to SMEs (e.g. government grants and loans), and the increase of exports. The objectives of the programme are:

- The establishment of a fund to support the financing of business;

- Logistical support for entrepreneurship in the form of equipment, production facilities and technologies;
- Formation of a business support infrastructure through the establishment of a body of state support for entrepreneurship (and providing it with great powers);
- Reduction of administrative barriers to the establishment and maintenance of business;
- Development of small and medium-sized forms of management;
- Encouraging the creation of institutions of self-support business in the form of production, marketing, and credit cooperatives;
- Support for innovative entrepreneurship;
- Assistance in the preparation of, and advanced training for, entrepreneurship;
- Creating an enabling environment for businesses, contributing to the creation of additional jobs.

In addition to the denomination of its objectives, the programme also contains information on its implementation, financing (with concrete financial resources needed), priority fields in the business sector, management, monitoring, indicators and expected results. Furthermore, an action and financing plan is annexed. The State Entrepreneurship Fund is one of the main instruments mentioned in the programme which has been implemented (see below).

The *National Strategy of Education Development* approved in 2012 consists of a systematic analysis of the current situation in the country's education system (with quite a few quantitative indicators), the description of major challenges and risks – divided into the different levels of education - development priorities, implementation mechanisms, monitoring and evaluation criteria, financing mechanisms as well as the expected results of implementation. With regard to the requirements of a capable innovation system and its main actors, the education strategy contains important approaches, particularly in the area of basic vocational education, secondary and higher vocational training. The analysis of the major concerns of the three education levels shows that the government is quite sensitive regarding the need to further restructure and modernize the educational system. Concerning basic vocational training, for instance, acute shortage of industrial training specialists and the low qualification level of teachers are amongst those considered as serious concerns. Inconsistence with labour market demand reduces the effect of basic and secondary specialized vocational education. With a view to higher vocational education, the strategy underlines that the current labour market is not capable of providing workplaces to the majority of higher education graduates in accordance with the specialty and level of their qualifications. These structural disproportions of the education system are coupled with staffing problems within it. On the basis of these deficits and challenges, concrete activities to be implemented are named. With relevance to innovation activities, the following measures are listed:

- Inclusion in educational programmes of basic vocational training components on management and business;
- Improving secondary vocational training in accordance with labour market demands and perspectives of societal development;
- Ensuring continuity of secondary vocational education with other education levels and mandatory inclusion of entrepreneurship principles;
- Modernizing the structure of higher vocational education in accordance with economic requirements.

Regarding structural changes to the education system, a network of basic and secondary vocational education institutions, ensuring geographic and programmatic accessibility to this level of education is planned. Likewise, technological parks (university centres); integrating regional industries, higher education institutions, colleges, lyceum, gymnasiums and schools. The different measures related to the economic sector are also mirrored in the expected results put forward in the strategy, namely:

- An effective network of training for staff and medium level specialists developed in accordance with forecasts of domestic and foreign labor market demands;
- Various forms of social partnership ensuring the participation of the real economy in staff training;
- Higher vocational education included in the generation of intellectual products for the country's economy – R&D, their commercialization, formation of intellectual property, consultation with authorities and business;
- New generation education standards and R&D activities developed and introduced and training processes brought into compliance with these standards;
- Higher education institutes holding small enterprises, business incubators and implementing scientific and technological projects.

In general, the National Strategy of Education Development is a document that points out the various challenges quite precisely (also by presenting concrete data) as well as measures to address these challenges. Furthermore, references are made for monitoring and evaluation activities. The chapter on the expected results meanwhile contains primarily qualitative targets.

The *Law on Science, State Science and Technology Policy* (last amended in 2013) is a broad document which includes general provisions (definition of different forms of research, scientific and technical activities, definition of scientific and research organizations and their tasks), as well as instructions on the organization and management principles of scientific and technical activities and ethical principles or rules. The objectives mentioned in the law are not sufficiently defined:

- Recognition of science as a socially significant branch which determines the level of development of the productive forces of the state;
- Use of various forms of public debate of priority directions of science... and projects which are carried out on the basis of competition;
- Guarantee priority development of basic scientific research;
- Integration of scientific, technical and educational activities based on the involvement of students and staff (creation of scientific and educational complexes);
- Support of competition and entrepreneurship in the field of science and technology;
- Concentration of resources on priority directions of science and technology;
- Promotion of scientific, technical and innovative activity through economic and other benefits;
- Development of scientific, technical and innovative activity by establishing a system of government and research centres and other structures;
- Development of international scientific and technical cooperation.

The specifications on funding activities remain propositions rather than concrete projects (e.g. establishment of a fund to support scientific and technical activities).

The *Concept of Innovation Development of Agriculture* (approved in 2014) underlines the need to develop new legal institutions and mechanisms to support the development of the agro-industrial complex or the sectoral innovation system. The objectives/policy directions are quite detailed, mentioning specific technologies, activities and systemic features. In addition, the concept presents extensive data, pointing to challenges and priorities. Information on concrete projects and their implementation, meanwhile, is quite scarce.³⁵

As already mentioned in section 3.1., Tajikistan has a *National Strategy on the Development of Intellectual Property*. The main objectives of the strategy are the complete formation of the intellectual property system, the integration of intellectual property (IP) in the socio-economic policy system and, on this basis, the improvement of economic competitiveness. Concrete objectives go from the improvement of legislation to the development of infrastructure, improvement of IP management at different levels, development of education and international, regional and bilateral cooperation. In addition to the description of the current state of the IP system (with a presentation of quantitative data and a SWOT-analysis), the stages of implementing the strategy over three phases are described.

Priority setting

On the basis of the different laws, resolutions, decrees and concepts summarized above, priority-setting takes place both on the horizontal level – primarily with a view to positive framework conditions – and the sectoral level (science and education sector, health system, energy and industrial complexes, agro-industrial complex). Given the fact that only a few measures have thus far been implemented, priority-setting by public authorities and at government level remains nontransparent. Against the background faced by Tajikistan, major socio-economic challenges not directly related to innovation or technological policy (energy, food safety, transport infrastructure, education, health) exist. The fact that public spending is primarily geared towards these challenges means that the budget for innovation policy appears to be insufficient in relation to the envisaged measures. In terms of the implementation of concrete financial measures to initiate or support innovations (in contrast to the improvement of the general framework conditions for innovations), different options are possible. The support of innovation activities can be linked with (all or a selection of) existing policies which focus on major societal challenges. Furthermore, new policies or programmes can be established or a combination of the two approaches is possible.

Foresight exercises

Strategic instruments prior to or within the process of implementing single innovation support measures are envisaged most likely in the area of evaluation and monitoring activities (e.g. IP strategy, Education strategy). A few laws and strategies also include qualitative and

³⁵ A report by the UNECE on promoting green innovation in Tajikistan (UNECE 2013) mentions the importance of irrigated agriculture which drives agricultural production. In Tajikistan, only half of the irrigable land is exploited and agriculture in mountainous areas is underdeveloped. Against this background, the report recommends the introduction of integrated water management systems and innovative green irrigation technologies.

quantitative indicators as well as SWOT-analyses (IP-strategy). More sophisticated instruments like foresight exercises, scenario techniques, vision-building and technology roadmaps are not, or only rudimentarily, used.

3.3 Innovation policy initiatives and instruments

As was pointed out in the last section, the Government of Tajikistan has made considerable progress regarding the improvement of legislative framework conditions. The strategies, laws, decrees and concepts summarized underline the importance of innovation and the creation of systemic competitive advantages for the country's further development. Nevertheless, a closer look at the concrete initiatives and instruments set out in the various strategies and laws reveals that most instruments have not yet been implemented. A lack of legislative implementation appears to be the main bottleneck. Tajikistan is at the starting point regarding innovation activities and related policies. Thus, the instruments depicted further below stand in sharp contrast to the number and requirements laid down in the legal documents.

State Fund for Entrepreneurship

Currently, the most important instrument of innovation policy is the State Fund for Entrepreneurship (SFE) founded in 2013. The Fund was originally managed by the State Committee of Investment and Land Property Management and now operates directly under the President of Tajikistan. The main objective of the SFE is the support of entrepreneurs or business companies in the manufacturing sector, particularly in the remote (mountainous) areas of the country. The Fund issues special loans (soft loans) and equity to companies. The SFE is an instrument designed to support the successful development of entrepreneurial companies through an array of business support resources and services, developed and orchestrated by management and offered through its network of contacts. In addition to the issue of loans and investment in companies through equity, the Fund carries out training and qualification activities for entrepreneurs. The credits or loans issued by the Fund are primarily used for (technical) equipment and tangibles. The target group consists of all industries within the manufacturing sector. All phases of the company life cycle are addressed (e.g. start-up phase, early growth phase, mature phase).

Since its operation began, the Fund has spent a budget of TJS 63 million (2013-2014). As mentioned by the President in his 2014 annual address, TJS one billion will be allocated to the Fund over the next seven years. As of March 2015, a total of 103 projects have been supported and the number of staff working in the Fund amounts to 20 people. The main funding criteria are a) the company is part of the manufacturing sector, and b) its location is at the periphery of the country. The average duration of loans amounts to one to three years. Since the beginning of operations, the Fund has seen the repayment of 9% of its loans. The main risks to achieving good results are clearly at the level of the different companies involved. A lack of management skills and a very low level of awareness are the biggest challenges. Against this background, training and seminars as complementary services of the Fund are quite essential.

The National Centre for Patents and Information

The National Centre for Patents and Information (NCPI) has been established under the Programme on innovative development and is operating under the Ministry of Economic

Development and Trade. The NCPI is in charge of all matters regarding Intellectual Property and Copyright. Above all, NCPI implements the Programme on the development of intellectual property rights for the period until 2020. The tasks include the following: a) awareness-raising on IP issues, b) the publication of standards for IP, c) establishing centres for commercialization in all institutes of the country, d) improving infrastructure, and e) enabling access to IP-related documents on the Internet. By providing these services, the NCPI certainly plays a crucial role in creating favourable framework conditions for innovation.

Instruments implemented by the Technical University of Tajikistan

The Technical University of Tajikistan has implemented a small measure called “International Forum”. The aim is the initiation of a competition among students to develop a concrete innovation project. Students should be representative of the different districts of Tajikistan, take into consideration the socio-economic potential of the districts and on this basis develop a concrete innovation project. The measure is linked to the Centre for Intellectual Development of Regions and the Centre for the Competitiveness of the Labour Market, both training centres for students.

The idea is to mobilize students from the different regions/districts of Tajikistan to improve their knowledge about the intellectual potential of the regions and solve the respective regional problems with innovative approaches (in working groups). After their successful training, students will return to their region to work for the Centres of Intellectual Potentials and implement their innovation projects. An example of this approach is the eastern part of the Pamir, where a project related to tourism and opportunities for investors is being implemented. Further to the instrument described, the Technical University supports professors in the establishment of companies through financial incentives for ideas on how to commercialize research results (50 so-called intra grant projects have been implemented). The budget for the measure comes from internal resources (i.e. student fees).

Instruments implemented by the Academy of Science of Tajikistan

The Academy of Science (AoS) has carried out a number of organizational measures to support innovation, namely the establishment of two innovation centres (the Centre for Medical and Biological Innovation and the Centre for Innovation in Health) and two labs (on Biological Security and Biomedicine). Another organizational measure is the foundation of a Cluster-Centre in which scientists, inventors and practitioners are working in order to introduce innovations. Furthermore, the AoS has implemented a process to identify innovative projects which are submitted to the Ministry of Economic Development and Trade for funding. The various proposals are evaluated by the National Coordination Council and, with a view to improving qualification levels, seminars and trainings are organized. Despite these organizational measures, the AoS is still not capable of the commercialization and transfer of research results. Innovative projects are understood as both fundamental and applied research projects. On the whole, the Academy of Science of Tajikistan is primarily a scientific organization, with the attributes of a public rather than entrepreneurial institution. The process of commercialization clearly leaves room for improvement; the chain from the identification of possible innovations, to further financing and possible exploitation remains in the public and bureaucratic system. Linkages to the profit-oriented sector – which could also be public owned companies – are underdeveloped.

Innovation-related approaches of the Agrarian University

The Agrarian University primarily carries out teaching and training rather than research and technological development. The teaching staff amounts to 500, among which there are 59 professors and doctoral candidates. Some research topics are quite applied-oriented, for instance, in the area of new types of cotton or wheat and new technologies of planting. Currently, scientists of the Agrarian University are involved in ten projects related to innovation. With only a few infrastructures conducive for innovation, the university owns a technopark (with three testing areas), trading farms (where all sorts of agriculture products are sold to students and teachers), and an agro-chemical lab. Commercial services of the university have generally comprised between 5% and 15% of total revenues.

Examples of projects in cooperation with international partners

International organizations like UNECE, UNDP, the World Bank, the European Bank for Reconstruction and Development, GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit, the Asian Development Bank, and the International Monetary Fund (amongst others) are implementing a large number of activities in cooperation with Tajikistani institutions. Innovation-related cooperation with Tajikistan primarily happens in the areas of agriculture, energy, climate change, environment/land use, water, transport and economic development in general. The UNDP, for example, is currently implementing a project on “Technology Transfer and Market Development for Small Hydropower”. The World Bank is working on a project with the aim of increasing the commercialization of farm and agri-business products, by improving the performance of selected value chains and productive partnerships.

Summing up, the different instruments and initiatives indicate the progress made in the area of innovation policy. Nevertheless, with the exception of the State Fund for Entrepreneurship, implementation of legislation is insufficient. The instruments scheduled in the different strategies and programmes have in large parts not been realized. The main reason seems to be the lack of funds of single ministries: for instance, the Ministry of Economic Development and Trade has no funds at its disposal to support innovation, the same applies to the Ministry of Industry and New Technologies. The main funding authorities are the National Coordination Council and the Examination Commission which select innovative and R&D projects submitted by the Academy of Science (among others) to be funded. Currently, 33 project proposals are pending due to insufficient funds. However, given the approaches of the Examination Commission and internal approaches from individual universities as well as the AoS and SFE, competitive funding allocation as an instrument to mobilize and select projects is widely used.

3.4 Assessment of the innovation strategy and programmes

This analysis has shown that the government of Tajikistan places great importance on innovation and its positive effects regarding poverty-reduction and economic development. An increasing awareness of the importance of innovations among policymakers and the administration resulted in considerable legislative measures and procedures in recent years. Many laws, resolutions and decrees – above all the law on innovation activities and the programme on innovative development – have been issued recently which indicates the growing importance of this particular policy field. Official documents on innovation policy

analysed for this report primarily focus on the framework conditions conducive for innovation activities, both in the public and private (business) sectors. Accordingly, legislation places emphasis on issues like intellectual property rights, copyright, technology parks, business support, public procurement and entrepreneurship development. With regard to specific industries, the agriculture sector, food industry, light-industry, and the mining and energy sectors are particularly important for Tajikistan's further economic development and, therefore, are expected to play an essential role with a view to innovation support. Apart from the legal aspects, the integration of the different ministries and committees in the process of priority-setting and strategy definition shows that the government is aware of innovation policy as a cross-sectional policy field with importance for various departments and responsibilities (particularly in science, technology and education policy, as well as economic and fiscal policy).

Against the background of the achievements of Tajikistan as regards the improvement of the legal framework conditions, numerous innovation-related projects have been implemented by involving international partners (mainly the World Bank, UNDP, EBRD and the Asian Development Bank). These projects build mainly on national and regional potentials in science, economy and administration with a view to natural resources and can principally be regarded as role models for similar measures implemented by the government itself.

Concerning national measures and instruments in the field of innovation support of the government, the State Entrepreneurship Fund is among the few measures that have already been implemented and which have the potential for significant leverage effects. The fund's objectives are to provide soft loans and equity to companies in the manufacturing sector. Given the budget of the fund, the number of staff and the organizational responsibility within the policy hierarchy, the State Entrepreneurship Fund is currently the most significant initiative to support innovation. On a decentralized level of different organizations within the national innovation landscape, a few initiatives have been launched with quite limited financial and personal resources. The Technical University of Dushanbe, for instance, has implemented a competition among students who work on innovative projects for possible commercialization. The Agrarian University and several of its faculties has a strong application orientation in research which results in the transfer of scientific data into the agrarian sector. Concrete instruments are the Techno Parks with three testing areas and the Trading Farms.

Summarizing the strengths in the field of innovation policy, it becomes apparent that there are surely many interesting approaches - legally, strategically and as regards the establishment of new structures and the design/implementation of concrete measures – which the government of Tajikistan has carried out. However, in order to catch up and achieve a significantly higher level of innovation and technology-oriented development, several challenges must be overcome.

First, the general framework conditions for innovation activities in Tajikistan leave room for improvement. Above all, the manufacturing sector is characterized by the dominance of light industries with a low level of innovation activities, technological development and absorption or adaptation of external technologies (either from abroad or other sectors). Due to the limited size of the sector as a whole and the majority of firms, a “critical mass” – conducive for self-enhancing processes – is missing. Like the manufacturing sector, agriculture exhibits very little or no innovation activities. Regional and national value chains integrating up and down

are underdeveloped or non-existing, leaving fragmented structures to dominate. The application of (new) technologies in the business sector primarily takes place within the context of foreign investment or foreign-owned companies, mainly in the mining and energy sector.

Further to structural hindrances, the qualification level within the Tajikistani business sector appears to be quite low, with a lack of entrepreneurial and technological capabilities and managerial skills. Entrepreneurial activities, with a view to the establishment of new ventures, are very low. A culture of entrepreneurship in the business sector, administration, and science and education sector – for instance, regarding entrepreneurship education or significant public-procurement activities – is missing. In general, due to structural obstacles and low level education and qualification, the absorptive capacity of the private sector for innovation impulses, R&D activities, technological development and adaptation of (new) technologies remains far behind the possibilities needed for a significant catch-up or development push.

The review of innovation policy in Tajikistan revealed a lack of legislative implementation. The existence of legislation in the form of several laws, resolutions, decrees and judgments is certainly an important starting point for development, but the application of concrete measures is too often absent. As pointed out above, the State Entrepreneurship Fund is the only instrument which has been implemented to date and which can rely on a considerable budget as well as managerial and administrative competencies. Other approaches designed at the level of different institutions (Academy of Sciences, Technical University, Agrarian University) are also good starting points, but their implementation is carried out at a very low level with limited financial and personal capacities and ambiguous prospects for commercialization of the underlying research activities. Within this context, successful examples in the most innovative countries indicate a positive correlation between the ability to transfer knowledge or commercialize public research and a certain degree of financial and organizational autonomy of universities and public research organizations.

Apart from the conceptual design of specific innovation-funding instruments, a coherent and comprehensible innovation strategy has not yet been adopted. Although a process of horizontal and vertical coordination and cooperation within the government system has been initiated recently (i.e. integration of relevant ministries and committees in the process of priority-setting and strategy definition), strategic capabilities (“strategic intelligence”) at various public authority hierarchical levels – including the implementation of strategic elements like agenda-setting, evidence-based conclusions (including the implementation of evaluation and monitoring systems), potential and SWOT-analyses, technological roadmaps, scenario-building and foresight exercises – leave room for improvement. Furthermore, the public authorities formally in charge of innovation policy and its implementation currently have no fixed budgets for innovation support at their disposal. With the exception of the State Fund for Entrepreneurship, which has been taken over from the State Committee on Investment and Property Management by the President of Tajikistan, no ministry or state agency has the autonomy to implement a long-term innovation strategy with specified milestones.

At the regional and decentralized level, capacities and structures to design and implement innovation support measures and improve framework conditions appear to be weak. However, experiences from leading countries indicate that regional innovation systems integrating regional actors are essential for framing the national innovation system. The rationale of this

approach is the perception that spatial, institutional and organizational “proximity” has a positive effect on the formation of a system as such and, as a result, the generation of innovation activities. As will be picked up in the following section on recommendations, the government of Tajikistan should implement legislation on strengthening regional innovation systems and transfer competencies to regional authorities. This approach would be in line with the delegation of administration and allocation of funds to the regional/local level of the civil service sector.

3.5 Recommendations

In recent 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 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). While the policy agenda with respect to structural reforms is huge, there is by now a clear blueprint of activities where international organizations can provide assistance. However, given limited policy capacities this agenda would need to be selectively prioritized. Priorities in this respect should 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 labour 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 the creation of favourable framework conditions for innovation financing (see also the recommendations on entrepreneurship and innovation financing in chapter 6);*
- *Increasing the skills level of the labour force (see recommendation 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); and*
- *Examine options and possible potentials for strengthening the role played by the Chamber of Commerce and Industry and the Initiative for SME development.*

Structural reforms generate markets supporting rules and organisations and in that respect are key preconditions for any market-based economy. Indeed, they are necessary but not, in our view, a sufficient precondition for growth. As we argued in our review of 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 the 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 a 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. Policy should target specific areas with potential such as labour-intensive industries like clothing, or natural resource-based such as cotton, or new sectors like ICT services. The authorities could consider:

- *Providing information on specific industries and companies (e.g. databases with company profiles) or through support of public-private 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; and*

- *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);*
- *Consider 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 support agencies with a certain degree of strategic and financial autonomy; and*
- *Verifying the public procurement system in general and in particular regarding innovation support; respective measures could include public procurement from 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, such as vision building, scenario techniques, technological foresight and roadmaps, and SWOT analysis (strengths, weaknesses, opportunities, threats). 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 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 organizations and donors.

Recommendation 3.5

With a view to improving the transparency of implementation of 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 fulfil 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; and*
- *Carrying out special analyses on particularly important developments regarding innovation and technology (e.g. sectoral studies, impact analyses, and regional analyses).*

Chapter 4

KNOWLEDGE TRANSFER, GENERATION AND ABSORPTION

Tajikistan, as a lower-middle-income economy, will have to focus predominantly on importing, absorbing and adapting to its own specific needs, knowledge and innovations from abroad. The scientific generation of knowledge for innovation that is globally new can only play a minor role under present conditions. Innovation is largely implemented by users or in their interaction with suppliers of machinery and equipment. Most often, innovation will be new to local firms and to the country and will be focused on adaptation of new equipment and mastering production capability through learning by doing. Most innovations will be incremental in nature, demand driven, and mainly based on learning, adoption and adaptation. They are local learning-based innovations, being diffused mainly within the country and based on adoption and adaptation.³⁶

However, importing, absorbing and adapting foreign knowledge and innovation does require significant technological capabilities. It takes technological capabilities to identify and understand foreign knowledge and innovations that are relevant and accessible for Tajikistan, to adapt them to local conditions, and to bring the resulting products to the Tajikistani market, or to produce them for the world market as part of international value chains. Education is an important necessary basis for building these capabilities, but it is not sufficient. This education need to be further deepened and extended in ways that can only be done effectively within the organizational context of enterprises.³⁷ This in turn requires commitment and investment in training by enterprises, their management and employees.

Domestic enterprises are major actors in the innovation process, but they are often heavily reliant on technological knowledge that is embedded in foreign trade, subcontracting and foreign direct investment (FDI). It is quite important whether FDI and different value chain relationships like subcontracting are enhancing technological learning and capability accumulation in Tajikistan. In that respect, trade and FDI openness are key preconditions for this process to take place, but it is by no means guaranteed. What matters is less the pure “quantity” of FDI, but the learning potential of FDI and trade. It cannot be assumed that knowledge will be transferred automatically without conscious efforts to maximise knowledge spillovers that may emerge from trade and FDI linkages.

The present chapter explores factors that drive knowledge transfer, generation and absorption in Tajikistan. It discusses the extent to which Tajikistan possesses the necessary capabilities, to what extent it has succeeded in absorbing and adapting foreign knowledge and innovation, what policy support is in place, and what more needs to be done.

³⁶ Xiaolan Fu, Giacomo Zanella, George Owusu Essegbey, Jun Hou, and Pierre Mohnen (2014) Innovation in low income countries: A survey report, within framework of the DFID-ESRC Growth Research Programme, November.

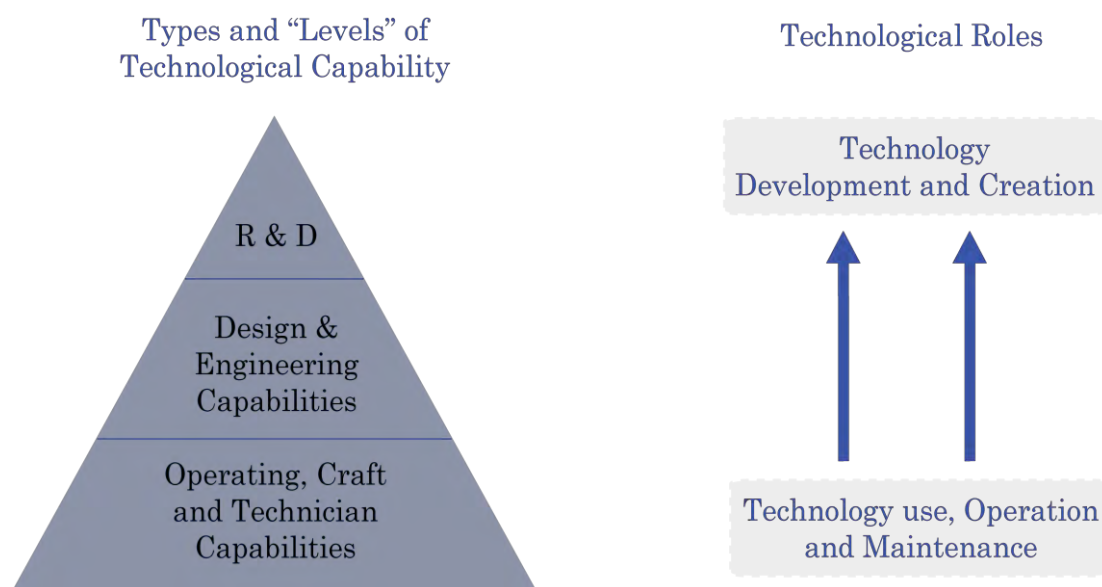
³⁷ M. Bell (2007), Technological learning and the development of production and innovative capacities in the industries and infrastructure sector of the LDCs: What role for ODA?, background paper for Least Developed Countries Report 2007, UNCTAD, Geneva.

4.1 Production and technological capability

Production capability is the capability to produce at world standards of efficiency and quality at a given technology. It is the capability to use and operate given forms of technology in specific configurations and should be distinguished from the capability to create and implement innovations in production and to change the forms and configurations of current technologies in use.³⁸ Capabilities to create new knowledge or to transform knowledge into new specifications are referred to here as R&D and technological capabilities. R&D capabilities have the potential to generate new knowledge at the world frontier, but they are also required to absorb knowledge from abroad or at the world frontier. However, R&D is rarely sufficient for generating innovation. Non-R&D activities, which are closely related to either R&D or to production, are design and engineering capabilities and they are very often key to the industrial growth of many middle-income economies.

As illustrated in Figure 8, it can be argued that design and engineering capabilities are “not only a necessary two-way linkage between R&D and production, when R&D activities already exist, but they are also a necessary basis for building those R&D activities in the first place - a ‘seed-bed’ in which R&D capabilities typically grow”.³⁹

Figure 8. Technological capabilities and roles



Source: Bell (2007).

For a lower-middle-income economy like Tajikistan, it is not only design and engineering but more operating, craft and technical or production capabilities that matter for further economic growth. Unfortunately, we have very limited data and insight into the bottom and middle part of the above pyramid and have a much better understanding of R&D, i.e. the top of the pyramid, but which is not the major driver of growth in developing economies.

³⁸ Martin Bell (2007), Technological Learning and the Development of Production and Innovative Capacities in the Industry and Infrastructure Sectors of the Least Developed Countries: What Roles for ODA?, UNCTAD The Least Developed Countries Report 2007 Background Paper, University of Sussex

³⁹ *Ibid*, page 65.

Most innovations in lower-middle-income economies are not formally related to the R&D system but are largely non-scientific innovations.⁴⁰ Technology upgrading of enterprises usually does not start from R&D capabilities and then progress downwards to building, design and engineering capabilities followed by operating and production capabilities.⁴¹ Instead, upgrading usually takes place the other way around from production capabilities and then gradually via incremental engineering improvements towards design and only at the very end towards R&D.⁴² Production capability activities are therefore the main area of technological activity in developing economies, and studies show that production capability, not technological capability, has been the major driver of productivity growth in transition economies so far.⁴³

Knowledge which is related to the production of goods and services is not formalized and is difficult to measure. Yet, some indicators can detect the scale of these activities. With globalisation, competent suppliers need to meet either generic or industry specific standards like ISO 9001 certificates or for example food safety standards. We use the following as proxies for production capability: ISO certificates, trademark applications and job-based assessment and/or training activities.

ISO certificates are generic management standards which indicate that there are in place business processes which should guarantee operational efficiency though not necessarily its improvements. ISO adopters have far lower organizational death rates than matched firms within their industries, and their sales and employment grow substantially more rapidly post certification than at matched firms.⁴⁴ With globalization, ISO certificates have spread as an internal mechanism of quality control and as a precondition for firms to participate in global value chains.⁴⁵ They are also a proxy for a variety of industry-specific standards which are difficult to aggregate. The literature shows that certificates provide a way for firms to communicate about unobservable attributes, thereby generating a growth effect for certified organizations.⁴⁶

Figure 9 below shows trends in the number of ISO 9001 certificates for Tajikistan and its peer economies. It shows that the number of Tajikistani firms that have adopted ISO 9001 standard is close to zero. This is a reflection of the almost complete detachment of the Tajikistani economy from global value chains including subcontracting networks. It also shows limited interest in management and operational efficiency.

⁴⁰ Anna Schwachula, Maximiliano Vila Seoane, Anna-Katharina Hornidge (2014), Science, technology and innovation in the context of development. An overview of concepts and corresponding policies recommended by international organisations, ZEF Working Paper Series, ISSN 1864-6638, Department of Political and Cultural Change, Centre for Development Research, University of Bonn, Working Paper 132, Bonn, June 2014.

⁴¹ Bell (2007).

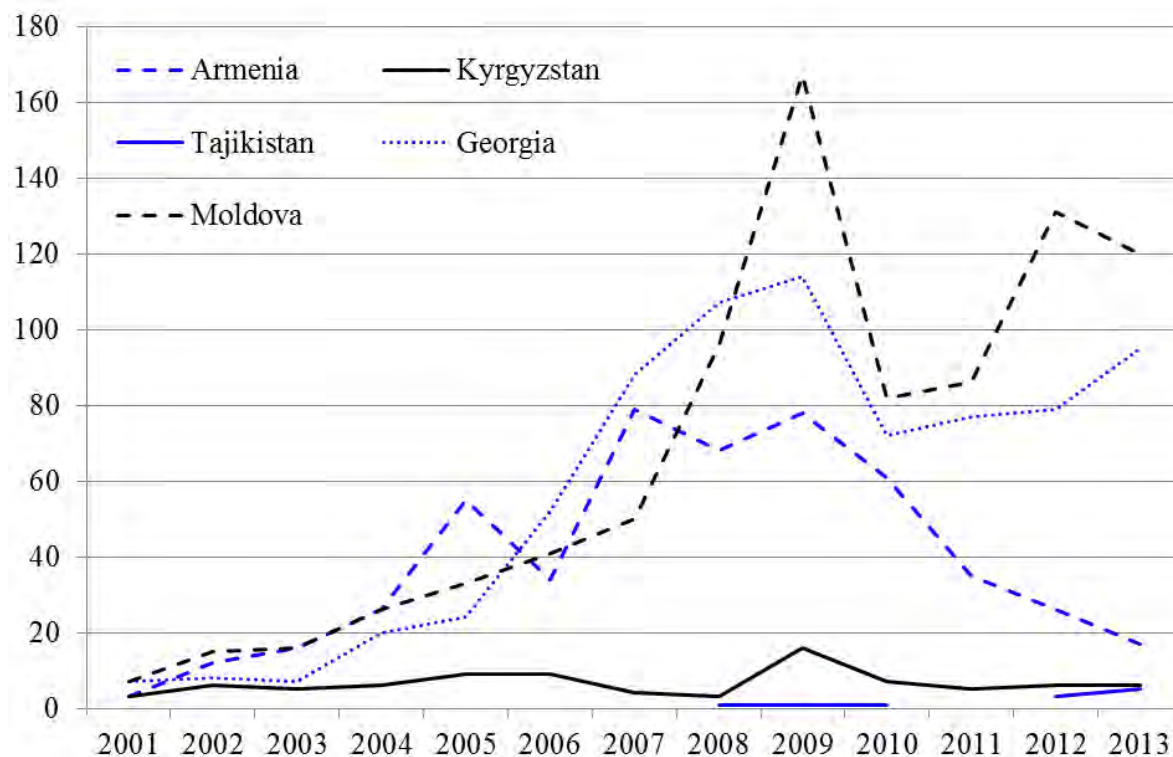
⁴² M. Hobday (1995), *Innovation in East Asia: The Challenge to Japan*, Aldershot: Edward Elgar.

⁴³ V Kravtsova, S Radosevic (2012), Are systems of innovation in Eastern Europe efficient?, *Economic Systems* 36 (1), 109-126.

⁴⁴ David I. Levine and Michael W. Toffel (2009), *Quality Management and Job Quality: How the ISO 9001 Standard for Quality Management Systems Affects Employees and Employers*, Harvard Business School Working Paper 09-18.

⁴⁵ Thomas H. Stevenson and Frank C. Barnes (2001) Fourteen Years of ISO 9000: Impact, Criticisms, Costs, and Benefits, *Business Horizons*, May/June: 45-51.

⁴⁶ Ann Terlakk and Andrew A. King (2006) The effect of certification with the ISO 9000 Quality Management Standard: A signalling approach, *Journal of Economic Behavior & Organization* Vol. 60 (2006) 579–602.

Figure 9. ISO 9001 certificates

Source: ISO Database.

The food industry is quite important for Tajikistan but no Tajikistani company has certified for the ISO 22000 food safety certificate. ISO data show that there were only two Tajikistani companies in 2008 and 2009 that were covered by ISO 22000 certificates.

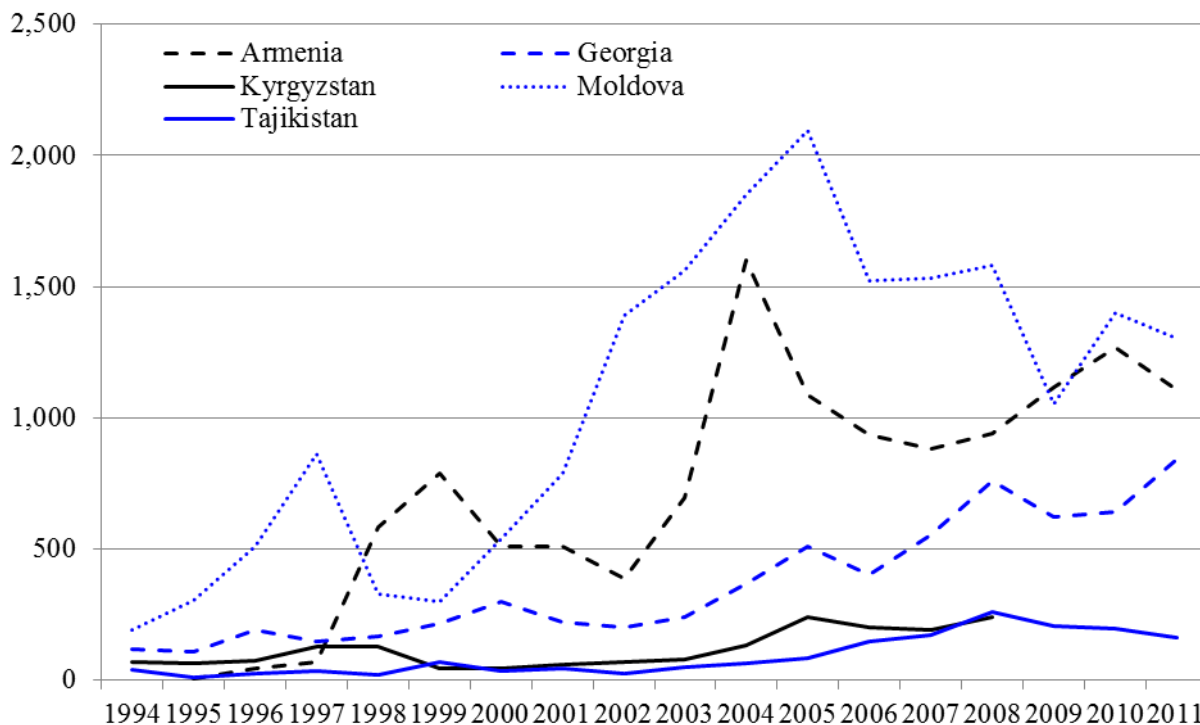
Trademark applications are also a proxy for developed production capability in the service sector. They also proxy for marketing innovation and thus suggest that firms have differentiated production capabilities or brands.^{47, 48} Some have argued that the global distribution of trademarks is skewed towards high-income industrial countries and that they are concentrated in research and development-intensive sectors such as pharmaceuticals, scientific equipment and the chemical industry.⁴⁹ Figure 10 shows that with respect to trademarks, the situation is somewhat better than with respect to ISO standards. Probably as a result of increased local competition, high economic growth and increased demand before 2008, the number of trademark applications by Tajikistani companies has increased to 259. However, due to the effects of the economic slowdown they declined to 161 in 2011.

⁴⁷ Valentine Millot (2009) Trademarks as an Indicator of Product and Marketing Innovations, STI Working Paper 2009/6, OECD

⁴⁸ Mendonca, Sandro, Tiago Santos Pereira and Manuel Mira Godhino (2004) Trademarks as an indicator of innovation and industrial change, Paper presented at the DRUID Summer Conference Industrial Dynamics, Innovation and Development, Elsinore, Denmark, June 14-16, 2004

⁴⁹ Eugenia Baroncelli, Carsten Fink and Beata Smarzynska Javorcik (2004) The Global Distribution of Trademarks: Some Stylized Facts World Bank Policy Research Working Paper 3270, April 2004

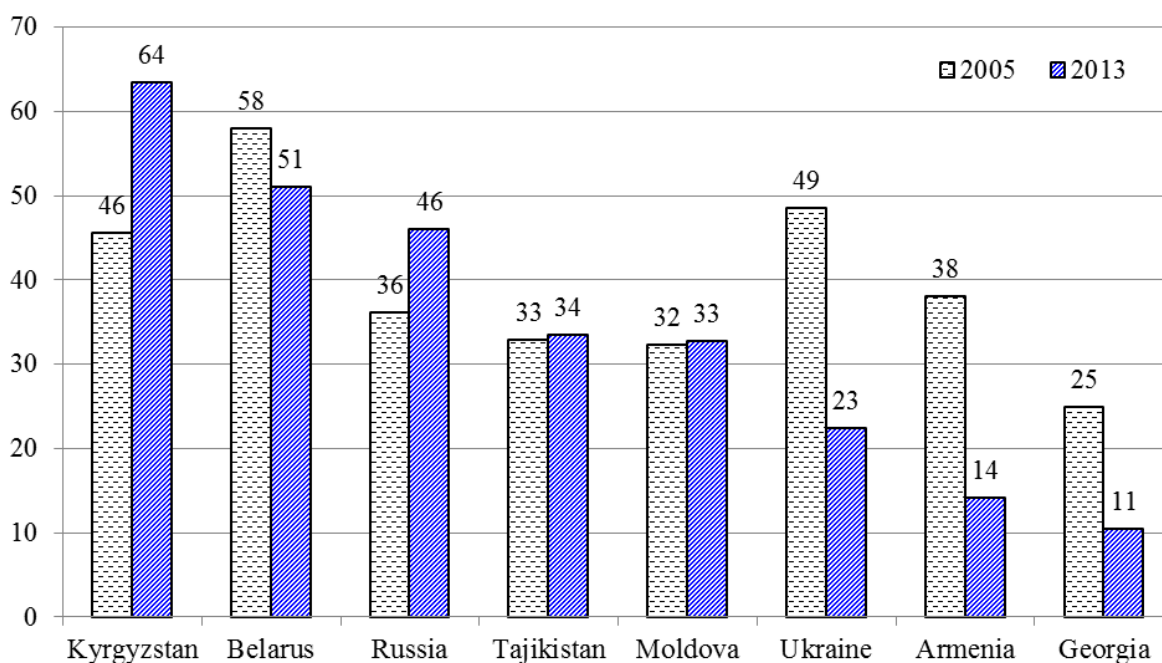
Figure 10. Trademark applications, direct residents



Source: WBDI 2014.

On the job training is a proxy for the capacity of human capital to work effectively with existing technology, and shows the degree to which local firms invest in the workforce quality. Tajikistani companies do better than would be expected given their weak positions with respect to ISO standards and trademarks. Around 33-34% of firms offer formal training to employees, which puts Tajikistan in the middle of its peers’ distribution (Figure 11).

Figure 11. Firms offering formal training (per cent of firms)



Source: World Bank, Enterprise Surveys (<http://www.enterprisesurveys.org/>).

These data are supported by subjective assessments of the extent of staff training, based on the World Economic Forum's Global Competitiveness Report survey of the business community where Tajikistan scores in line with the averages for CIS and lower-middle-income (LMI) countries (Table 5).

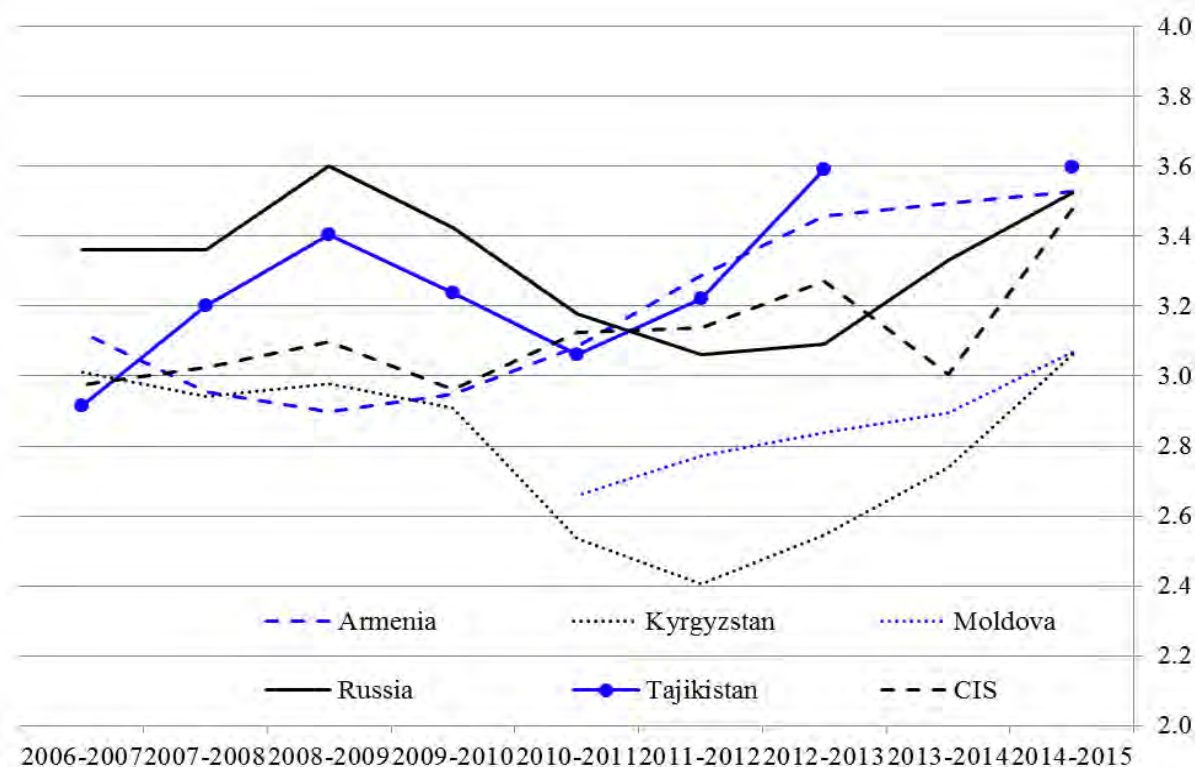
Table 5. Assessment of extent of staff training, 1-7 (best), 2014-2015⁵⁰

	Armenia	Kazakhstan	Kyrgyzstan	Moldova	Tajikistan	Ukraine	CIS	LMI
Score	3.4	4.1	3.5	3.4	3.7	3.8	3.7	3.7

Source: WEF GCR 2014-2015.

This is further supported by the unexpectedly high assessments of Tajikistani firms in terms of the sophistication of their production processes, where they are ranked above or close to the CIS average (Figure 12). This should be viewed in the context of the production activities and industrial structure in which local firms are engaged rather than in absolute terms compared to some external benchmark.⁵¹

Figure 12. Assessment of production process sophistication



Source: WEF GCR 2014-2015.

Note: Weighted averages.

⁵⁰ The question asked is: "In your country, to what extent do companies invest in training and employee development? [1 = not at all; 7 = to a great extent]"

⁵¹ The question asked is: In your country, how sophisticated are production processes? [1 = not at all-production uses labour-intensive processes or old technology; 7 = highly-production uses sophisticated and knowledge-intensive processes]

Surprisingly high production sophistication is accompanied by even higher buyer sophistication⁵² where Tajikistan ranks close to Russia and above average for lower-middle-income economies (Table 6). It seems that production (supply) and buyers' (demand) sophistication are mutually reinforcing, exerting pressure for improvements in production capabilities. This buyer sophistication may result from the impact of remittances and the associated local increase in purchasing power in excess of GDP. This is reflected by high levels of construction activity, and in consumer industries, e.g. food processing. However, it is not certain whether this push can reach critical mass to induce technological upgrading.

Table 6. Assessment of buyer sophistication, 1-7 (best), 2014-2015

	Armenia	Kazakhstan	Kyrgyzstan	Moldova	Tajikistan	Ukraine	CIS	LMI
Score	3.4	4.0	3.4	3.0	3.6	3.4	3.5	3.2

Source: WEF GCR 2014-2015.

Note: Based on weighted averages.

Overall, Tajikistani firms are not present in global value chains, and their involvement in international standards of management and operational efficiency and safety is almost non-existent. There is therefore great scope for policy action in this area. Furthermore, it seems increased local competition and buyer sophistication is pushing firms towards differentiation through local brands and trademarks - which is a very positive finding. Finally, this is accompanied by a surprisingly high level of attention by firms to the development of their employees' skills, confirmed by both hard and soft data.

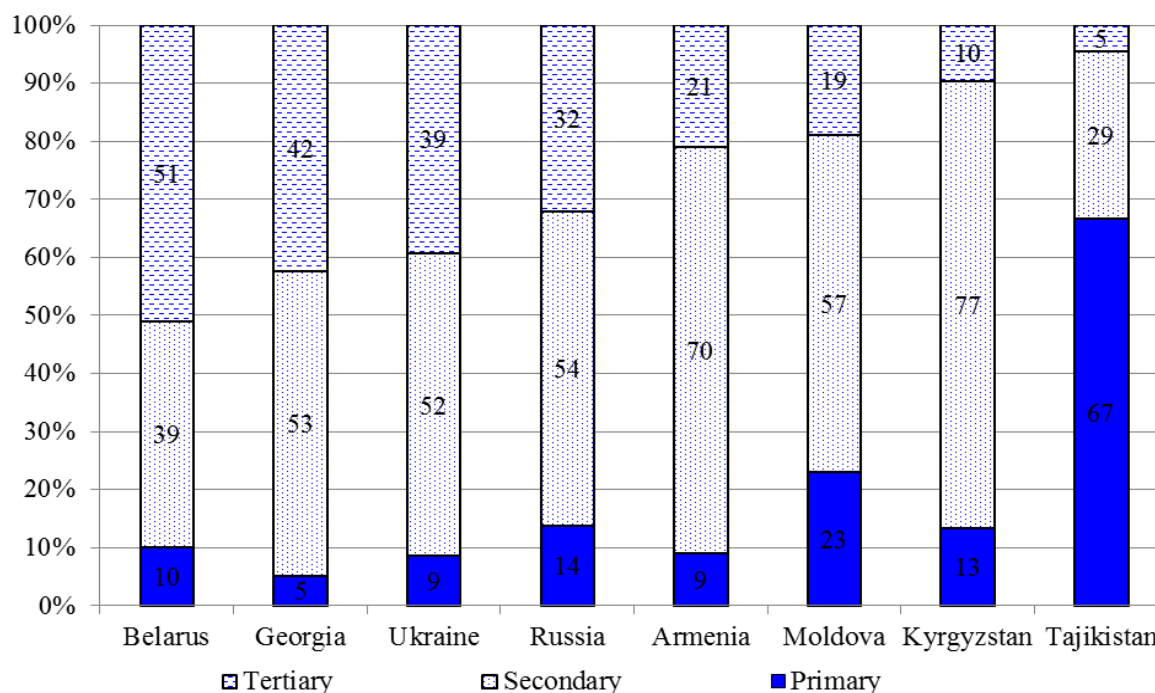
4.2 Human capital and skills

Technological capability is embodied in tangible form in equipment or in an intangible form in software, as well as in the skills of the labour force, enabling enterprises to operate physical plant and equipment at a high level of productivity, and to introduce new products and production processes. The shortage of employee skills in mastering production techniques and managerial skills is regarded as a serious constraint to innovation in developing economies.⁵³ This may lead to low rates of operating performance, high training and other associated labour costs and excessively high operating costs if skilled expatriate labour is required to run large complex facilities.⁵⁴ Developing the skills of Tajikistani workers in achieving production capability, as well as promoting the transfer of knowledge which geographically mobile workers may have acquired elsewhere, require both firm targeted investment and active public policy support. Tajikistan has a young population and is not rich in exportable natural resources, meaning investment in human capital should be one of the country's strategic priorities. It seems that there is demand for highly skilled workers in Tajikistan, as only 5% and 29%, respectively, of unemployed workers have tertiary and secondary education (Figure 13). So unemployment, which in 2013 stood at 10.7%, is largely an issue for those with only primary education, and only partly for those with secondary education.

⁵² "In your country, how do buyers make purchasing decisions? [1 = based solely on the lowest price; 7 = based on a sophisticated analysis of performance attributes]", 2013-14 weighted average

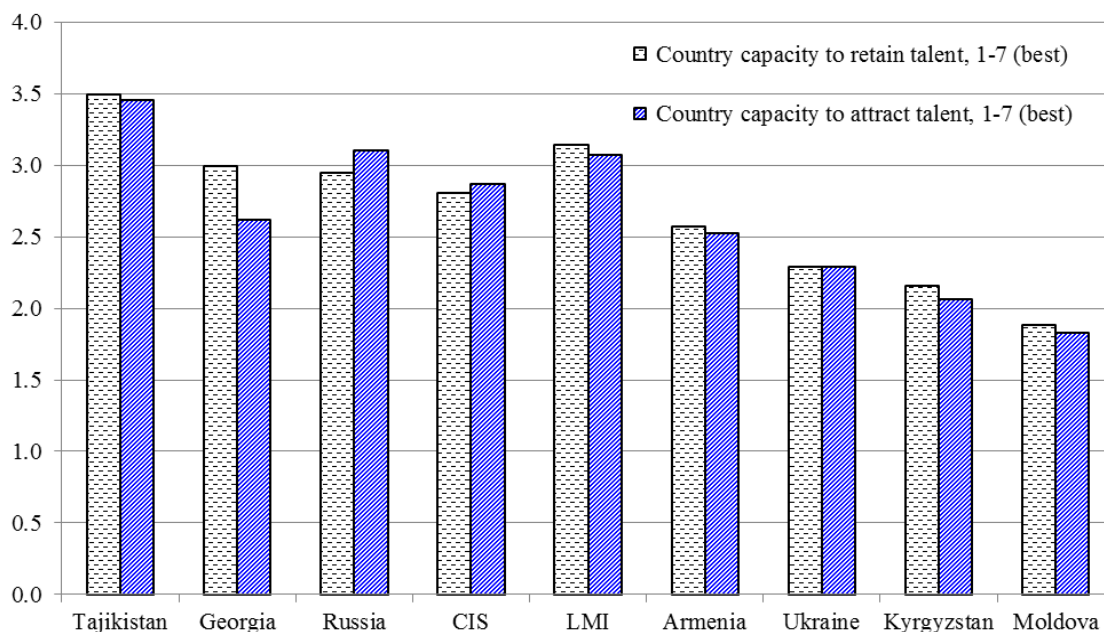
⁵³ X. Fu, G. Zanello, G. Owusu Essegbey, J. Hou and P. Mohnen, Innovation in low income countries: A survey report, DFID-ESRC Growth Research Programme.

⁵⁴ Bell (2007).

Figure 13. Unemployment by level of education (per cent of total), 2013

Source: International Labour Organization, Key Indicators of the Labour Market Database.

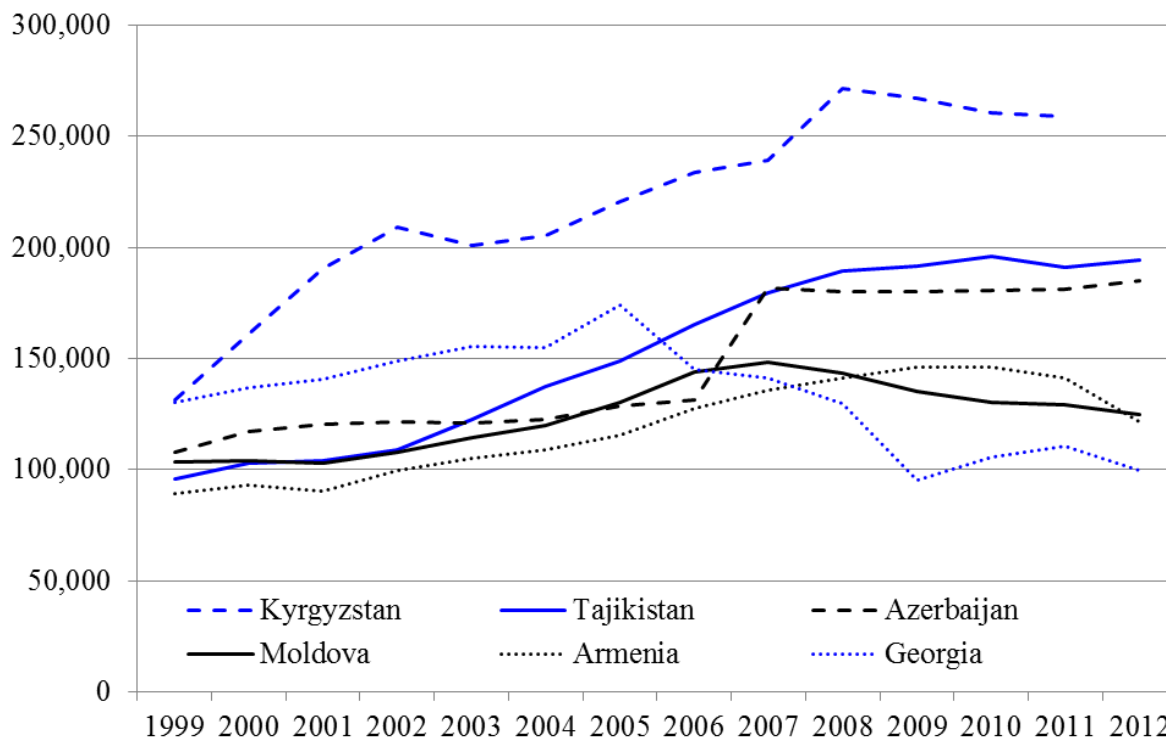
Subjective assessments by the business community confirm Tajikistan's capacity to attract and retain talent (Figure 14), with the country viewed as having a relatively favourable environment for attracting and retaining skilled workers compared to its peer group.

Figure 14. Assessment of countries' capacity to attract and retain talent, 2013-14

Source: WEF GCR 2014.

Higher education expanded, with enrolled students increasing from 103,400 in 1999 to 184,800 in 2013 (Figure 15), although since 2008 crisis conditions appear to have limited both public and private funds for education.

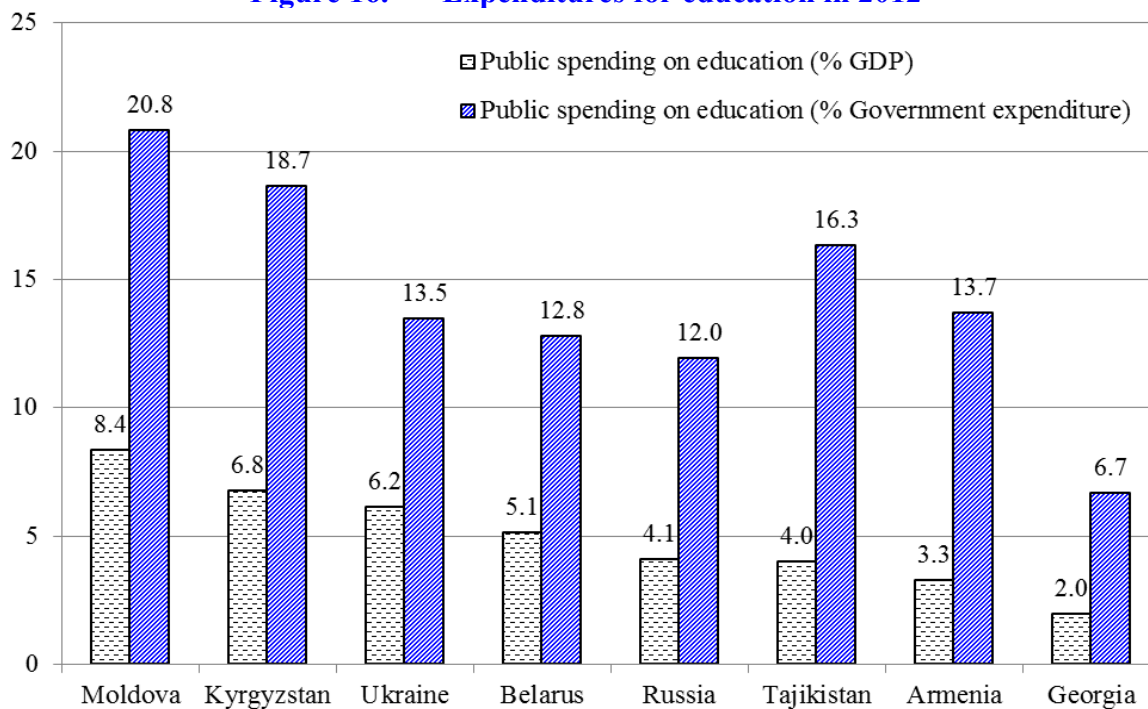
Figure 15. Enrolment in tertiary education (number), 1999-2012



Source: WBDI.

The Government spends 16% of its budget on education, which is comparable to its peer countries, although relative to the size of the economy, the overall public spending at 4% of GDP is at the lower end of the peer group (Figure 16). Whether this is adequate or insufficient can be better understood by looking at gross enrolment rates.

Figure 16. Expenditures for education in 2012

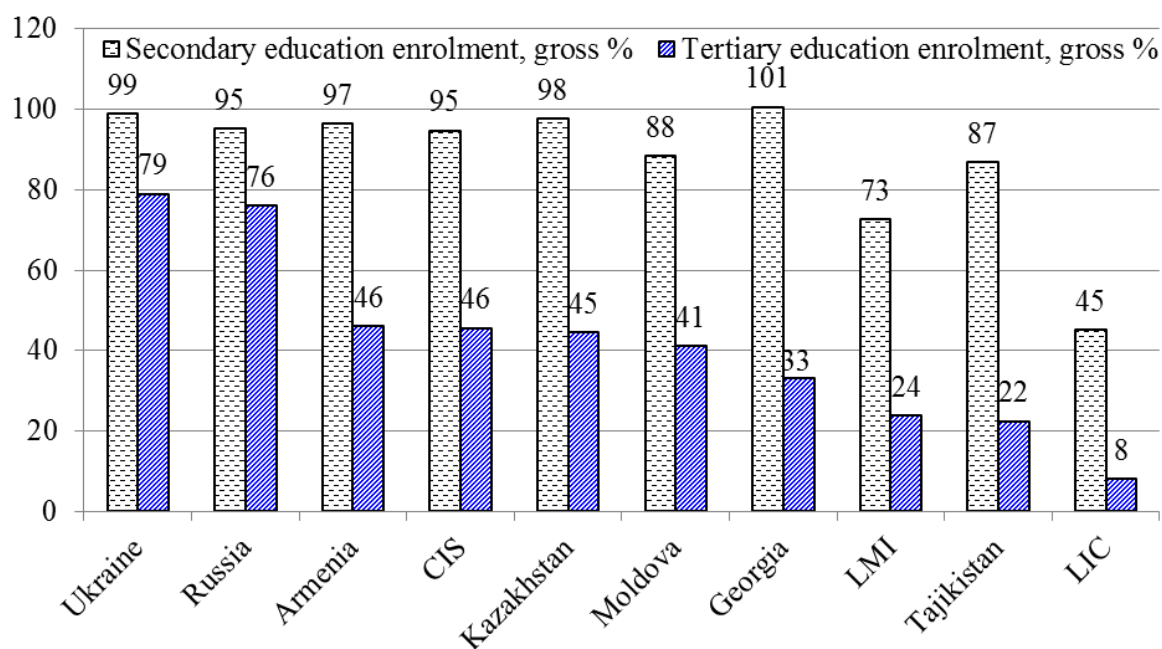


Source: WBDI 2014.

Note: Data for Russia 2008, for Kyrgyzstan and Ukraine 2011.

In terms of tertiary gross enrolment rates, Tajikistan is well above the average for low-income countries, but also well behind the CIS average of 45.6%. Within its peer group of lower-middle-income countries, Tajikistan performs well in terms of gross secondary enrolment rates, but slightly below average in terms of gross tertiary enrolment rates (Figure 17). So there is extensive room for expansion of enrolment rates in higher education, but probably the first priority should be to improve the quality of higher education.

Figure 17. Gross enrolment rates,⁵⁵ 2012



Source: WEF GCR 2015

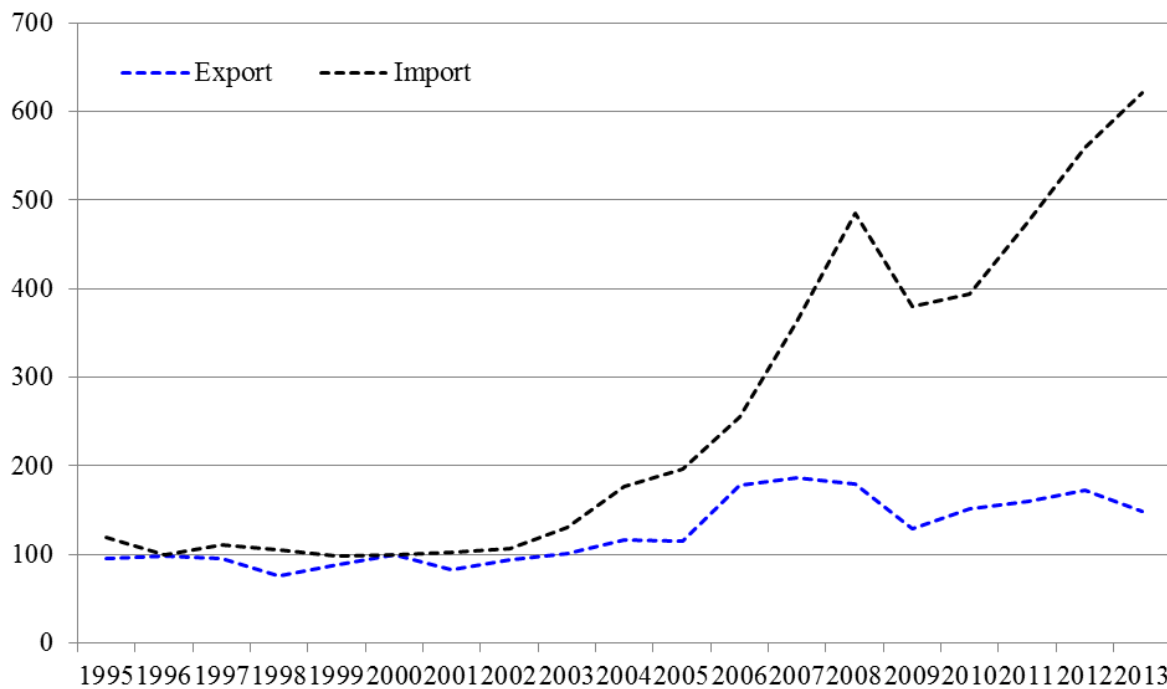
There are no reliable data on the quality of education, but the business community evaluates different dimensions of education (overall quality, quality of mathematics and science education and quality of management schools), to be around the CIS average. However, our fieldwork suggests that the education system of Tajikistan is in need of internationalization and quality improvement.

4.3 Openness and acquisition of knowledge via trade, global value chains and FDI

Tajikistan faces a trade balance constraint, which it has balanced with high remittance inflows. However, this source of income is quite sensitive to external shocks, and the country should therefore substantially improve its export capacity. Figure 18 shows how much the foreign trade deficit has increased. Even assuming that past levels of remittances will be maintained, it is quite uncertain how the economy could grow at rates required to raise the living standards of a growing population without increased exports.

⁵⁵ Gross enrolment rates are the ratio of total tertiary (secondary) enrollment, regardless of age, to the population of the age group that officially corresponds to the tertiary (secondary) education level

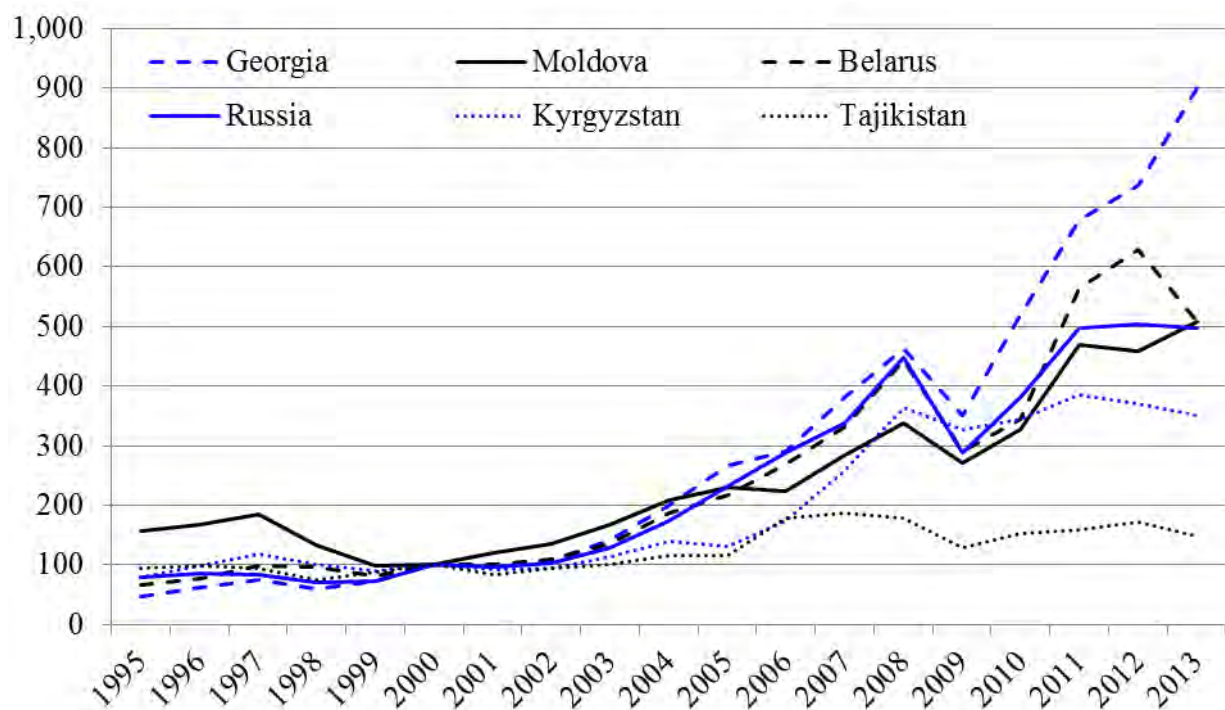
Figure 18. Exports and imports by value (index 2000 = 100)



Source: WBDI.

Exports increased by only 48% between 1995 and 2013, dramatically less than in peer countries (Figure 19), e.g. Georgia, where exports increased nine-fold. Most peer countries saw increases even after the onset of the global financial crisis in 2008.

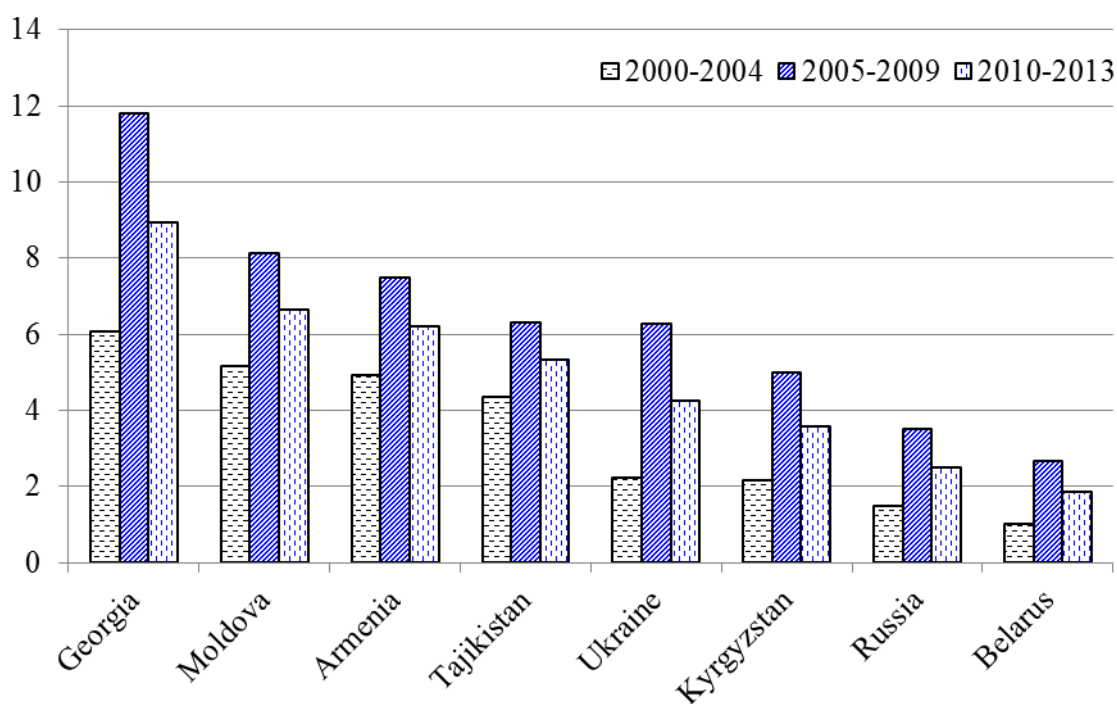
Figure 19. Export value index (2000 = 100)



Source: WBDI.

This aspect of Tajikistan's economy reflects primarily a very poor or almost non-existent integration into global value chains, but also specific Tajikistani difficulties in foreign trade due to the country's geographical position and underdeveloped trading infrastructure. This is also reflected in a very limited inflow of FDI, which in the pre-crisis period peaked at a very small 6.3% of GDP and then dropped to 4.3% in the recent period (Figure 20). When compared to Tajikistan's peers, these shares are broadly comparable. But in a wider international context and given the huge investment needs of the country, this is unsatisfactory. Low labour costs make Tajikistan in principle attractive for export-oriented subcontracting and FDI, but such investments are rare. At present, much more is local market-seeking FDI, but even this is very small in absolute terms and dominated by two big investments in cement and aluminium factories. Unless individual strategic investors are attracted into the country, FDI will increase only with the return of higher economic growth.

Figure 20. Foreign direct investment, net inflows, per cent of GDP (averages)

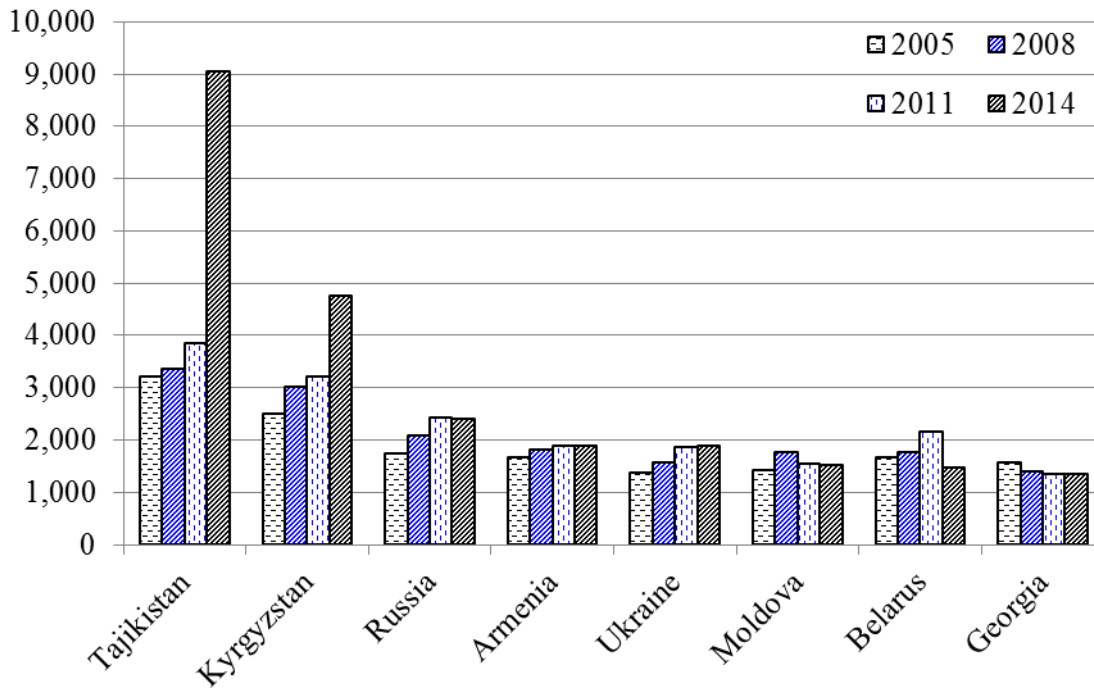


Source: WBDI 2014.

Limited and rather anaemic exports are not only the result of the country's weak industrial base but also of its geographical position, which makes trading expensive compared to other economies. Tajikistan shares some of these features with Kyrgyzstan, while some are specific Tajikistani disadvantages.

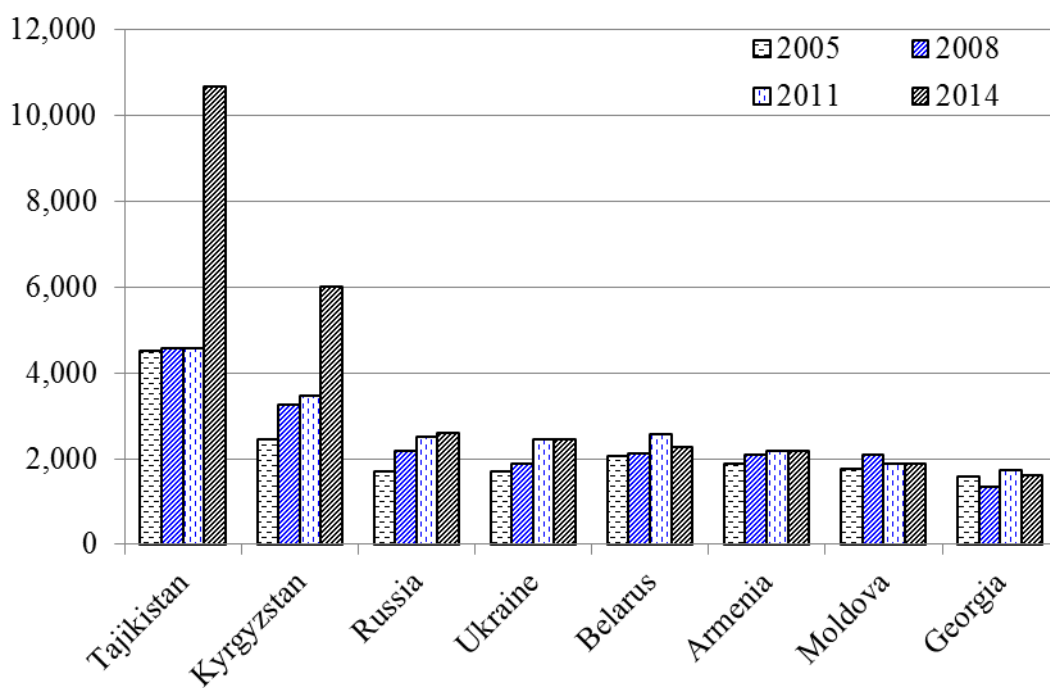
First, the costs of exporting and importing per container are double those of Tajikistan's peers (except Kyrgyzstan). In 2011, the costs of export per container were \$3,850 for Tajikistan, while for Armenia and Georgia they were \$1,885 and \$1,355, respectively. More recently, these costs have escalated to \$9,050 when exporting and \$10,650 when importing, making Tajikistani export and import shipping costs five times more expensive when compared to peer CIS countries (except Kyrgyzstan) (Figures 21 and 22).

Figure 21. Cost to export (\$ per container)



Source: WBDI 2014.

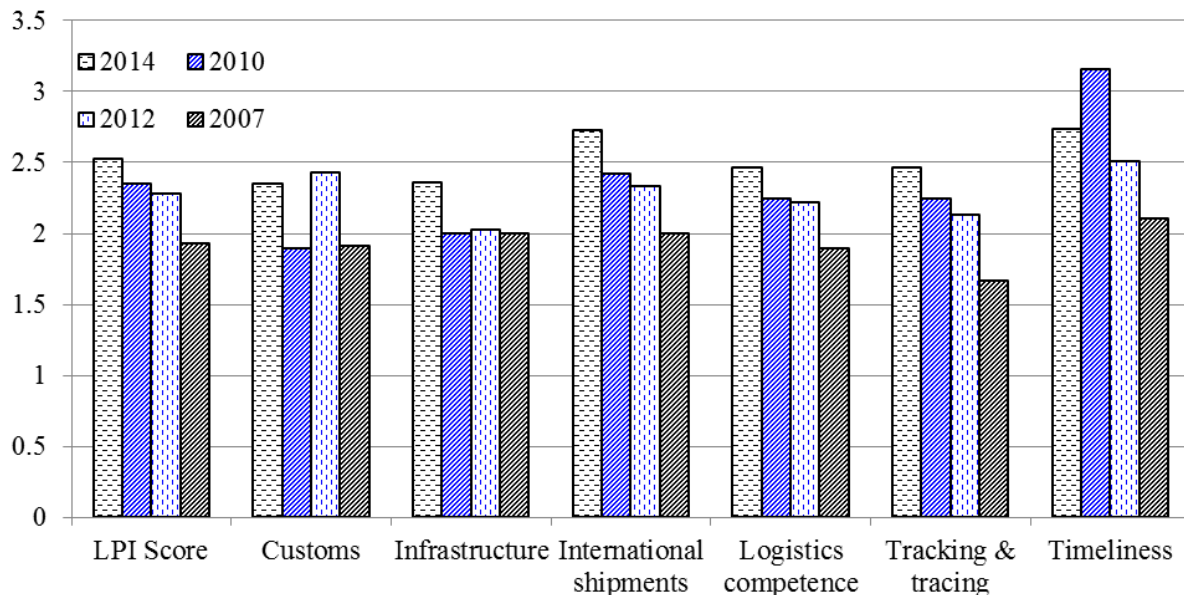
Figure 22. Cost to import (\$ per container)



Source: WBDI 2014.

Some of these difficulties can be observed through the Logistics Performance Index.⁵⁶ This index demonstrates comparative performance on a scale (lowest score to highest score) from 1 to 5. The average for Tajikistan remains low at 2.5, although representing a gradual improvement on the 1.9 score in 2007 (Figure 23).

Figure 23. Logistics Performance Index and its components: scorecard, 2007-2014



Source: <http://lpi.worldbank.org/>.

A comparison with Kyrgyzstan, which also faces high transportation costs shows that the main issues for Tajikistani businesses are not so much charges (with the exception of railroads) but very poor quality of trade- and transport-related infrastructure (e.g. ports, roads, airports) and on average very poor competence and quality of service delivered. Contrary to the LPI data, the above respondents report no improvements in this respect since 2011 - except for a much-improved level of service from private logistics companies.⁵⁷

We do not have estimates of how much higher transportation costs make Tajikistani trade more expensive. However, given the very low value added to the bulk of exports, this can be assumed to create a substantial cost disadvantage which can be substituted only by higher value added content. Any significant potential advantage in labour costs cannot be fully exploited due to higher transportation costs, which mean Tajikistan will need to give priority to its transport infrastructure and also to improve the value added content of its exports so that it can sustain its higher costs. There are historical examples, Japan being perhaps the best

⁵⁶ LPI is the weighted average of the country scores on the six key dimensions:

- 1) Efficiency of the clearance process (i.e., speed, simplicity and predictability of formalities) by border control agencies, including customs;
- 2) Quality of trade and transport related infrastructure (e.g., ports, railroads, roads, information technology);
- 3) Ease of arranging competitively priced shipments;
- 4) Competence and quality of logistics services (e.g., transport operators, customs brokers);
- 5) Ability to track and trace consignments;
- 6) Timeliness of shipments in reaching destination within the scheduled or expected delivery time.

⁵⁷ http://lpi.worldbank.org/domestic/environment_institutions/2014/C/TJK/C/KGZ

known, of countries that managed to overcome cost disadvantages by improving the quality of goods and services. IT and Internet related business also offers one obvious route for such economies, with Armenia being the closest example.

However, while the Armenian diaspora played a significant facilitating role in the country's development this is much less the case for Tajikistan, which needs to find ways to turn the diaspora into a driver of growth. It seems that business linkages and know how acquired by working in Russia are still not productively used in the local economy.

4.4 Own R&D and technological capability

Innovation is often quite wrongly equated to research and development.⁵⁸ There is evidence which shows that even in developed economies such as the EU, 50% of innovating firms do not conduct any R&D.⁵⁹ Rather, it is often design and engineering capabilities that are key innovation activities and the major driver of demand for R&D once enterprises reach a certain technological level. Tajikistan has a relatively undeveloped R&D system, and so its technological upgrading must start from production capability and engineering skills. R&D will still play an important role in this process, not as an independent source of growth but mainly as a source of knowledge to absorb and adapt new technologies from abroad.

While developing economies like Tajikistan do need to invest in R&D, the key issue is that the R&D required in developing economies is to increase the economic and social capacity to absorb and adapt outside knowledge. Private R&D often emerges out of design and engineering activities in medium and large firms. This is in clear contrast to the prevailing idea that somehow innovation and marketable products can emerge directly out of public R&D labs or by “commercializing” the results of public research. Such expectations are usually faced with stark realities that show that innovation is a complex, market-driven process where R&D represents just one of several factors that lead to innovation.^{60,61}

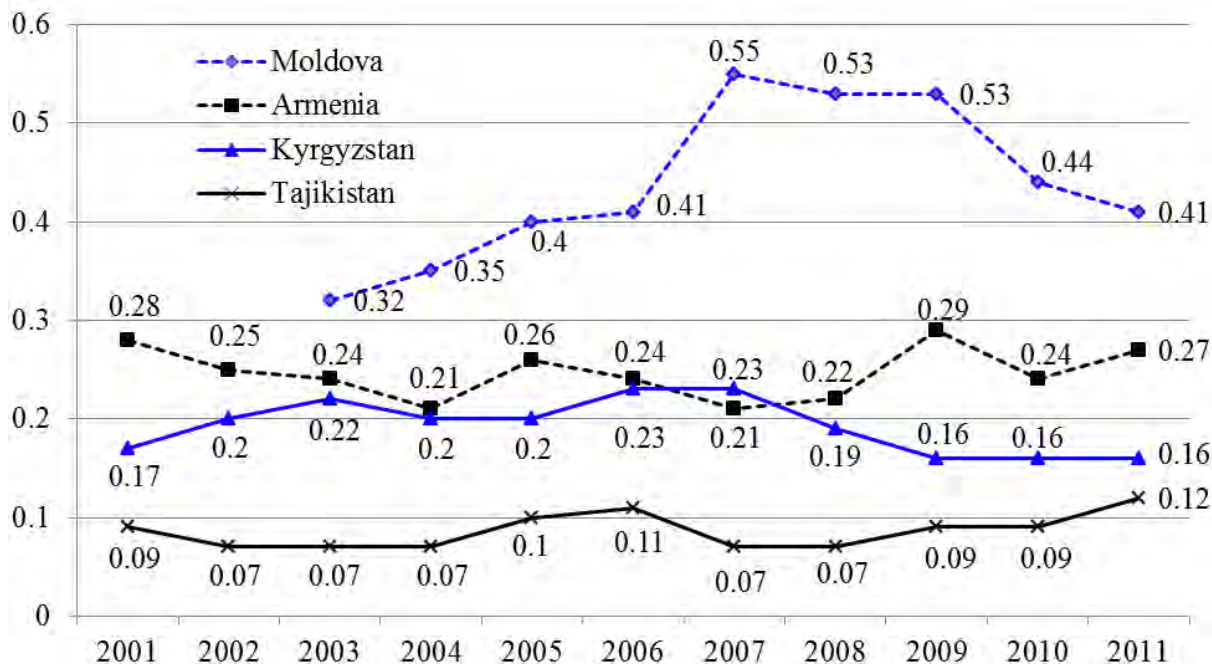
Tajikistan R&D investments are quite marginal when compared to peer economies. They range around 0.1% of GDP which is half of Armenian or relative shares, and way below the levels of 0.4 - 0.5% of GDP seen in Moldova (Figure 24).

⁵⁸ Bell (2007)

⁵⁹ A. Arundel, C. Bordoy and M. Kanerva (2008), ‘Neglected innovators: how do innovative firms that do not perform R&D innovate? Results of an analysis of the Innobarometer 2007 survey No. 215’, INNO-Metrics Thematic Paper

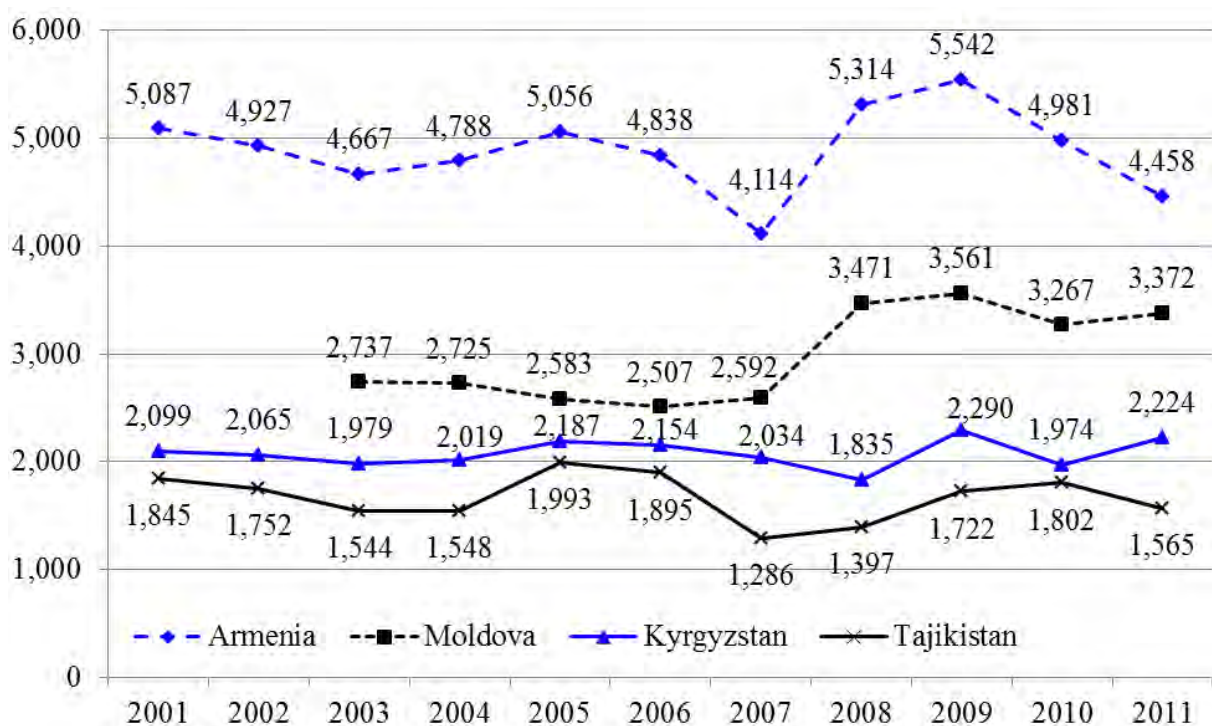
⁶⁰ S. Radošević (2011), Science–industry links in Central and Eastern Europe and the Commonwealth of Independent States: conventional policy wisdom facing reality, *Science and Public Policy*, 38(5), June 2011, pages 365–378.

⁶¹ R. Brown and C. Mason (2014), Inside the high-tech black box: A critique of technology entrepreneurship policy. *Technovation*, 34(12), pp. 773-784. (doi:10.1016/j.technovation.2014.07.013)

Figure 24. Gross expenditure on R&D (GERD) in GDP

Source: UNESCO IUS.

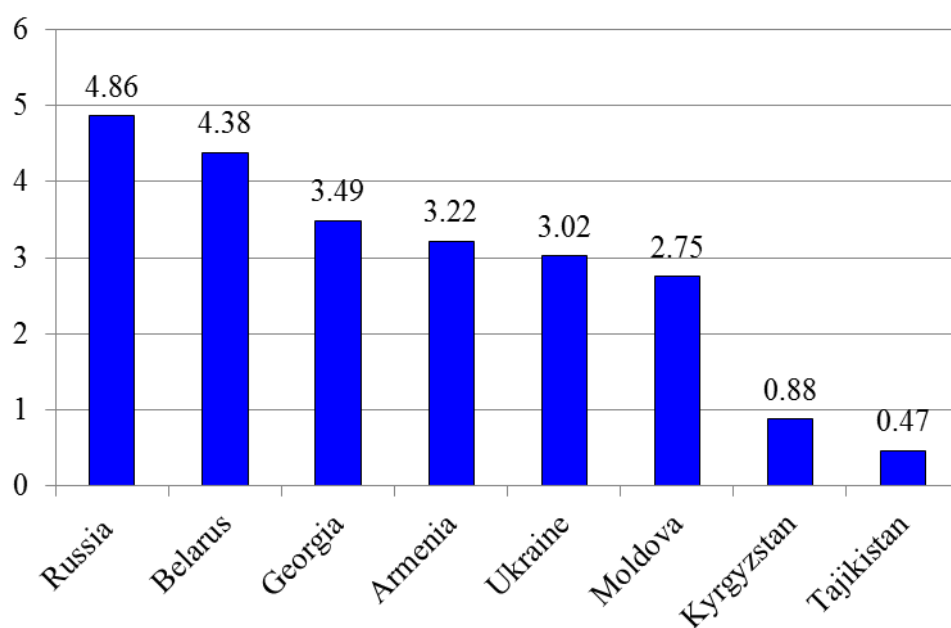
Tajikistan's R&D system employs only 1,565 researchers (simple headcount, not full time equivalent terms), which has declined slightly over the past few years (Figure 25). These are largely researchers employed in the system of the Academy of Sciences. The numbers show no correlation with economic growth, meaning its drivers are not linked to changes in demand and supply in the economy and neither are they the outcome of anti-cyclical policies.

Figure 25. Number of researchers (headcount)

Source: UNESCO IUS.

In relative terms or when researchers are expressed as a percentage of the labour force, Tajikistan ranks poorly (Figure 26). It has 0.47 researchers per 1,000 labour force, or just over half the level of Kyrgyzstan, and six to seven times lower than in Armenia and Georgia. This very low R&D intensity in the labour force is an issue of concern as it hinders absorption of new knowledge from abroad, not only in the private but also in the public sector. Also, such low R&D intensity has a direct impact on higher education, which lags in terms of quality as only small numbers of teachers are involved in research and thus have difficulty keeping up with the moving knowledge frontier. This will have deleterious effects on the diffusion of new technological knowledge to the younger generations.

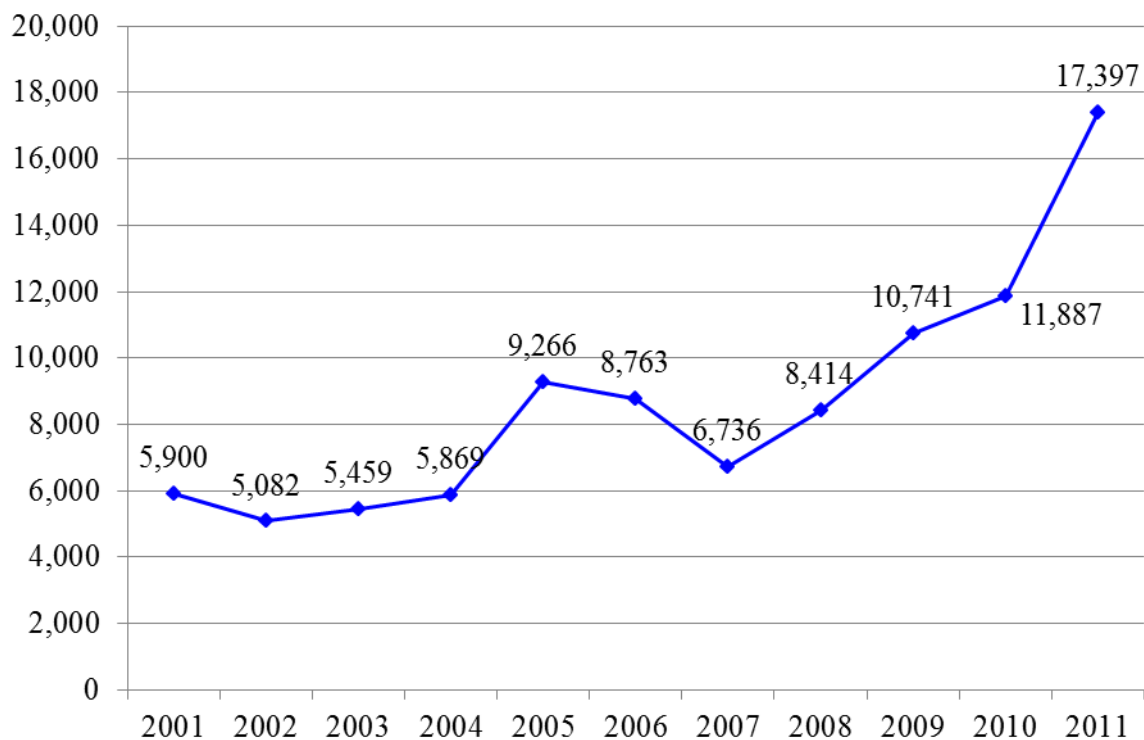
Figure 26. Researchers per thousand labour force (headcount), 2011



Source: UNESCO IUS.

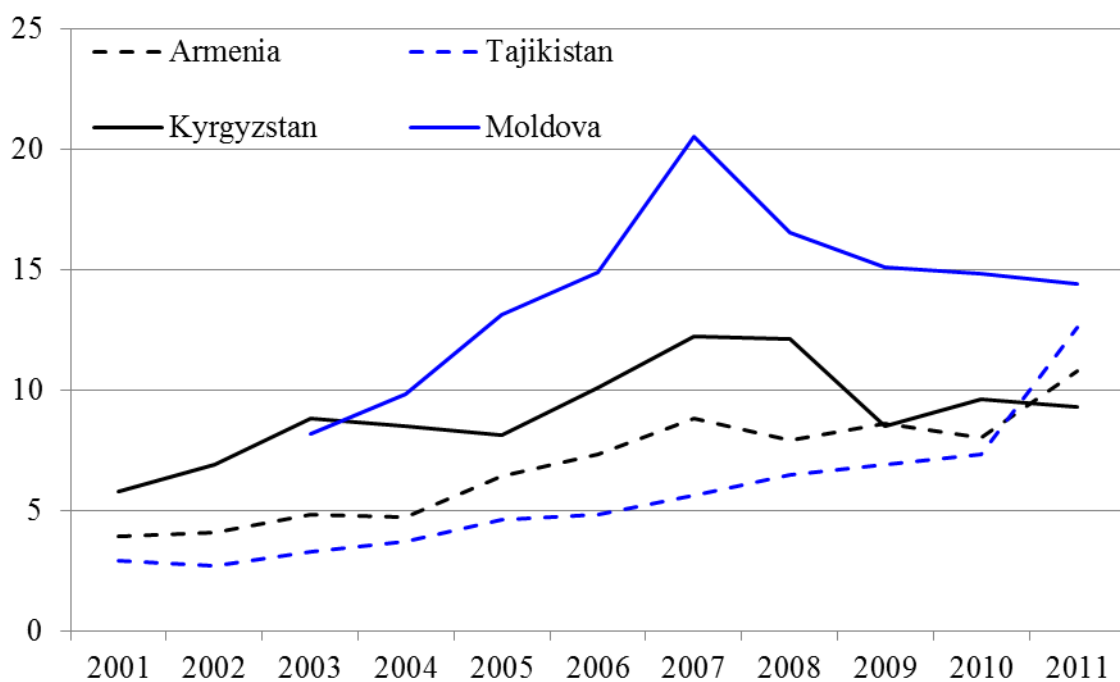
Note: Figure for Georgia is for 2005

Still, it is encouraging that there has been a strong increase in the level of gross expenditure on R&D (GERD), which reached \$17 million in 2011, double the absolute amount of 2008 (Figure 27). It is difficult to explain these changes as the economy has entered into a crisis period. It may reflect an unchanged proportion of public R&D and changes in relative prices which have increased the purchasing power of the R&D system.

Figure 27. Tajikistan: GERD in constant 2005 prices (\$ PPP)

Source: WBDI 2014.

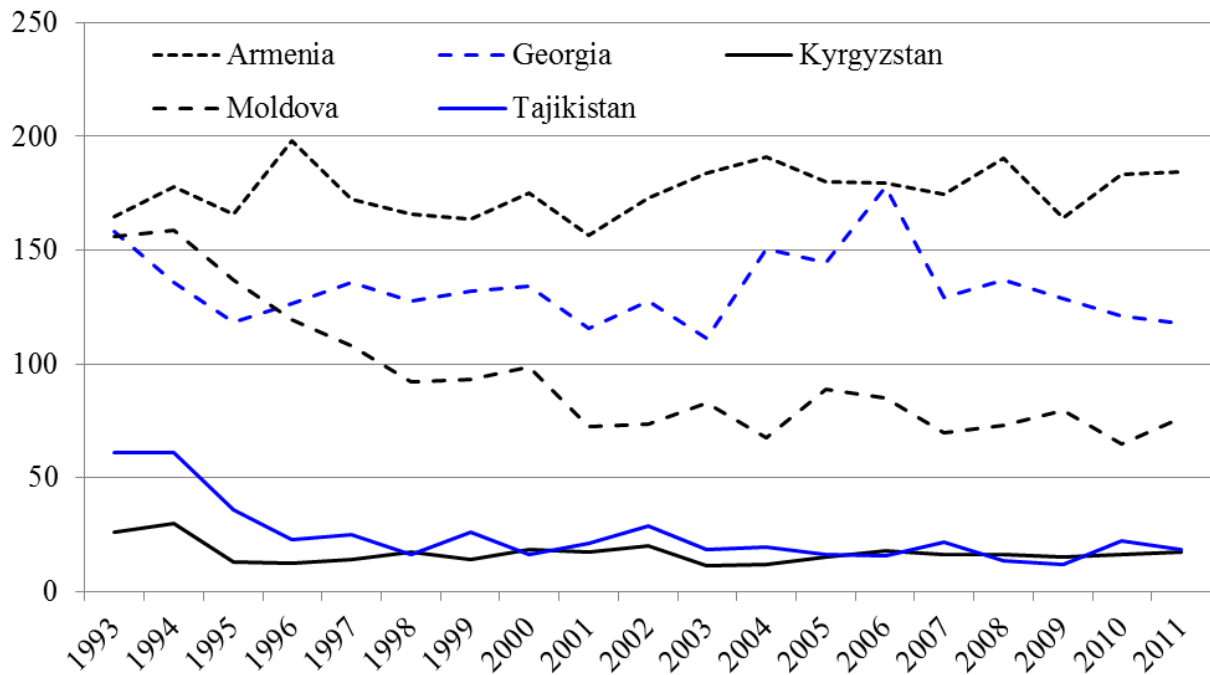
This absolute increase in GERD is reflected in overall expenditure per researcher, which increased to reach \$12,000 per researcher in 2013 (Figure 28). Tajikistan is reaching expenditure levels per researcher comparable to its peers, which should enable more advanced research and new equipment purchase, facilitating much needed catch up.

Figure 28. GERD per researcher, FTE in constant 2005 prices (\$ PPP)

Source: UNESCO IUS.

The improvements in terms of increased investment per researcher are not yet visible in terms of S&T journal papers, which remain at the extremely low level of around 20 papers per annum (Figure 29). These are internationally recognized publications, meaning papers that are contributing to the world S&T frontier. In this respect, Tajikistan is at around the same level as Kyrgyzstan. Tajikistan’s peers have also seen stagnation in their number of S&T journal articles, showing challenges across these CIS countries in accessing the world S&T frontier. This is to a certain degree to be expected, as in these economies science should play a larger role in assisting in the absorption of foreign knowledge.

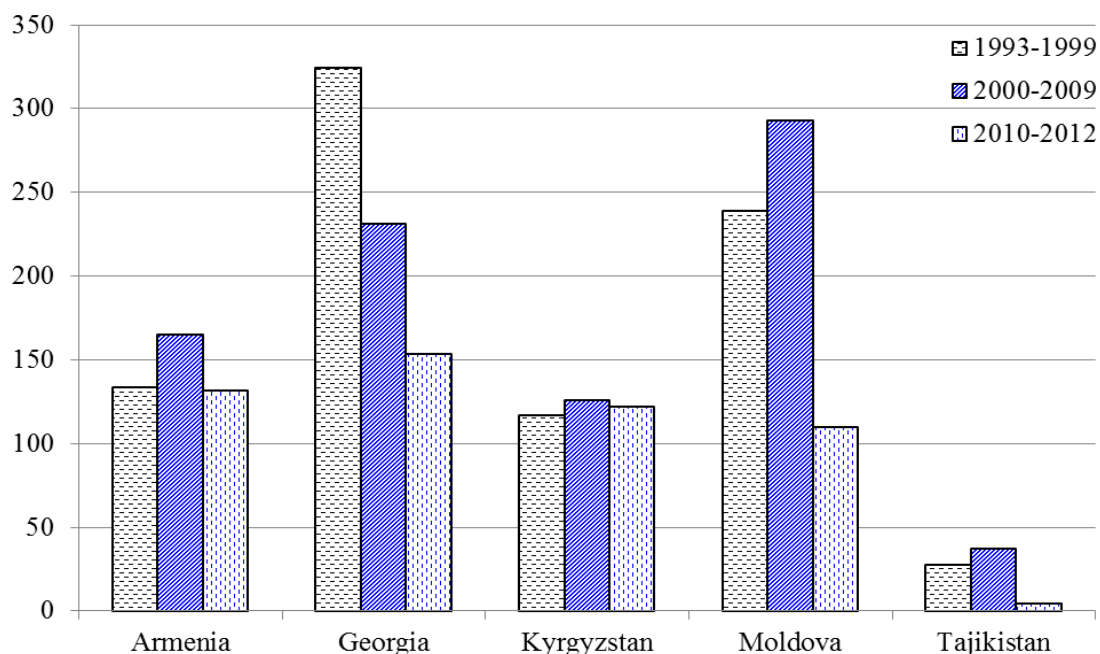
Figure 29. Scientific and technical journal articles⁶²



National Science Foundation, Science and Engineering Indicators.
 Source: WBDI.

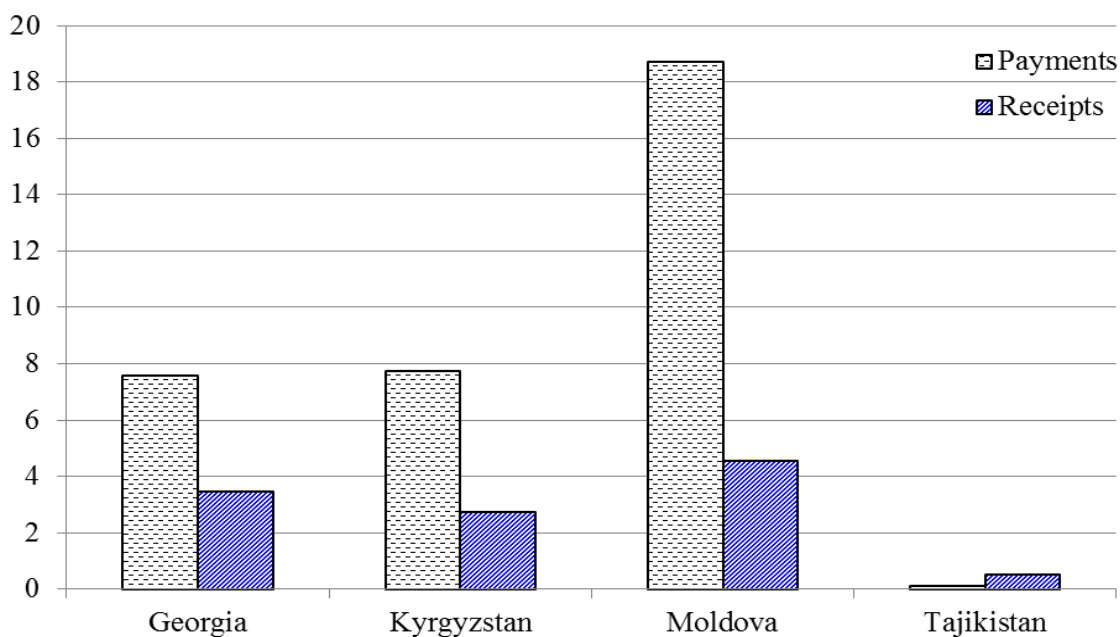
While Tajikistan is comparable to Kyrgyzstan in terms of the publication of scientific and technical journals, Tajikistan lags further behind in terms of international (PCT) patents, where absolute numbers are very low (Figure 30). This again suggests that Tajikistan is not contributing to new technological knowledge at the world frontier.

⁶² Scientific and technical journal articles refer to the number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.

Figure 30. Average number of patent applications by residents

Source: WBDI.

Moreover, Tajikistan is not purchasing foreign disembodied knowledge in the form of licences for patents and technical expertise. In such a case, Tajikistan would be expected to have a strong negative technological balance of payments, indicating the import and use of foreign knowledge. Instead, its technological balance of payment shows that the economy of Tajikistan is not yet at the level to pay for and demand foreign know-how (Figure 31).

Figure 31. Technology balance of payment, 2012 (\$ million)

Source: WBDI 2014, payments and receipts for use of intellectual property.

The R&D system of Tajikistan remains marginal, but stabilized at a low level. Links with higher education are informal but strong through joint affiliations of Academy researchers who are also teachers – although the large majority of teachers are not involved in R&D. R&D's contribution is largely to facilitate the absorption of foreign knowledge through contracts with Academy institutes and universities, with enterprises and in a wide range of downstream services, e.g. consulting, metrology and testing. Attempts to create R&D-based innovation in the academic and higher education sectors have received policy attention but the scope and economic relevance remains limited. In fact, a focus on this dimension of R&D would be quite misleading. Tajikistani R&D would do better by continuing to strengthen its links to the business sector through contract R&D and internships but also by significantly improving the quality of education and strongly integrating R&D into the education system.

4.5 Policy recommendations

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.⁶³ This is production-related knowledge that 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 assist 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 to sustain these cost 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 for export markets in terms of product features and health and safety.

Recommendation 4.1

Tajikistan should take steps to further support improvements in the production capabilities of enterprises, which matter most for innovation and economic growth in 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 certification for compliance with ISO standards. While this*

⁶³ Comin, Diego, and Bart Hobijn. 2004. "Cross-Country Technology Adoption: Making the Theory Face the Facts." *Journal of Monetary Economics* 51 (1): 39–83.

should eventually become a national programme, these activities could be initiated at first in specific sectors where there is a critical mass of awareness that quality is a key precondition for exporting. Hence, such sectoral programmes could be initiated in food processing, 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; and*
- *Further encourage vocational, on-the-job and life-long training and learning. These are key capabilities that workforces need if enterprises are to deploy, use and adapt new technologies and processes, and to bring new or better products and services to the market. Even though Tajikistan does not compare unfavourably in this area to other transition economies, there is scope for further improvement.*

We cannot sufficiently emphasize 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 option than 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 countries at a similar stage of development. 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;*
- *Modernize and evaluate curricula to ensure 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; and*
- *Establish a dedicated programme of short- and medium-term international training programmes for researchers, scientific staff and students. Similar to our recommendations for Armenia, we see a strong need for a Tajikistani version of Kazakhstan's Bolashak programmes, based on a highly competitive selection process and on promising career opportunities. This might be incorporated into the existing Durakhshadagon 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 arrangements with major foreign investors based on explicit contracts with their subsidiaries to generate skills that can also be useful for other Tajikistani firms. These should be cost sharing partnerships (e.g., where some or all of the Tajikistani government's costs could be covered by tax breaks) with the local subsidiaries of multinational corporations (MNCs) in order to expand the scale of their training in technical skills beyond their own requirements and increase the pool of skills available to the industry as a whole. A carefully designed policy avoiding subsidizing activities that would have taken place anyway and provides incentives for additional training to upgrade skills could be a highly effective mechanism to generate skills needed for the economy. 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 for local vocational training (see also recommendation 5.1); and*
- *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 investor firms once they are established. In view of this constraint, free economic zones should be promoted on an ad hoc 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 remains at a very early stages. Whether it will be the private or the public sector that takes the lead in providing collective support services for the innovation needs of firms and other actors in local and regional innovation systems remains unclear. An innovation-related specialized service infrastructure like basic investment promotion, technology extension services, standards and metrology, productivity centres, 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 a springboard to development” agenda. Tajikistan is at the very beginning of building organizations able to directly support innovative projects or provide business services to support innovation. The authorities could:

- *Create business development and support services, such as 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 organizations providing assistance to enterprises in these areas, and the Government should aim to create them on a step-by-step basis;

- *Create productivity centres to help firms improve productivity and quality, including demonstration centres. These should be initially funded by the Government to raise awareness of the need to enhance productivity; and*
- *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.⁶⁴*

R&D in Tajikistan is at the 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 economy-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 systemic, cultural norms, and customs;*
- *Beyond this, there can be room in some disciplines for basic research if closely linked to education; and*
- *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.*

⁶⁴ 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), which 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 an agency could partner with other institutions to give expert advice and diffuse information to clients. The system is low cost, easy to implement, and requires low maintenance. CORFO also operates the Technical Assistance Funds, which aim to integrate modern business management techniques and new commercialization technology and strategies. See <http://www.sercotec.cl/>.

Chapter 5

ECONOMY-SCIENCE LINKAGES AND COLLABORATION IN THE INNOVATION PROCESS

Tajikistan is at an early stage of developing industry-science linkages (ISLs), and it can be more relevant to speak about “economy-science” linkages (ESLs). Agriculture, for example, accounts for 23% of GDP and 67% of employment, with industry accounting for only around 29% of GDP. This chapter examines the role of Government in facilitating ESLs, with a particular focus on the legal and policy framework, HEIs and specific examples from the industrial and agricultural sectors. Based on this assessment, the chapter makes a number of policy recommendations to improve the functioning of ESLs in Tajikistan.

5.1 Introduction

While traditionally less prevalent than in the industrial sector, innovation is increasingly important in agribusiness to raise value added, particularly through the further processing or manufacturing of raw products. With Tajikistan in the “low innovation category” of countries,⁶⁵ with a large agricultural sector of low productivity relative to comparator economies, there are many opportunities for modernization and innovation in the agribusiness sector to raise living standards. In both industry and agriculture, Tajikistani firms generally have either no or very limited in-house R&D. In advanced economies, firms in medium- and low-tech sectors typically have some R&D capabilities to support knowledge search and acquisition from outside the company. This is an area of weakness for Tajikistani firms, with limited knowledge absorption capabilities that, in some areas, has actually decreased.

More positively, this means significant scope for adaptation-based innovation, encompassing innovative products and processes developed elsewhere as well as management and marketing innovations. Adaptation-based innovation also requires the involvement of local science, with the most important role of academia in facilitating adaptation being through a better qualified workforce, as well as experimental development or testing to adapt foreign technologies and management techniques to the local environment, although it should be noted that there remains a role for research on the advancement of science. The room for novelty-based innovation is much narrower in low-innovation economies. However, the potential to break out of the low innovation equilibrium should not be excluded, with Tajikistan possessing a strong science base as well as framework conditions and programmes already paying some attention to promoting ESLs. The distinction between “breakthrough” innovation and adaptation-based innovation has also been to some degree addressed by legislative and policy measures.

5.2 Legal provisions and institutional mechanisms for technology transfer

Creating a modern legal and regulatory framework for an innovation system is a complex task when managing transition from a command to a market economy. Tajikistan’s legal system has progressed well towards what is needed for a functioning, contemporary market economy

⁶⁵ EBRD classification 2014.

through new laws and government decrees, with additional acts under preparation. Such actions are prerequisites for effective legislation and regulation promoting ESLs. Additionally, market-based technology transfer between foreign and domestic actors, as well as among domestic business and science, cannot occur without significant redeployment of key actors in innovation systems. A number of laws and regulations, typically emphasizing their relationship with the Civil Code, seek to achieve this and are preconditions for technology transfer and commercialization of science.

5.3 Legislation for transforming scientific organizations

As in most former Soviet republics, research was largely detached from HEIs and housed in the Academy of Sciences. After the collapse of the Soviet Union, Tajikistani legislation has sought to reintegrate research into HEIs, which is a crucial step towards the so-called “third mission” of HEIs which includes many forms of economy-science linkages beyond educational links. A range of legislation has targeted reform of both HEIs and the Academy of Sciences.

Higher Education Institutions

HEI governance falls within the legislation on Higher Education, Statutory Acts and the Charters of HEIs. Among the most important recent legal acts, *The Law on Higher and Postgraduate Professional Education* (hereafter: *Law on Higher Education*, LHE) takes the governance and management of HEIs to the operational level⁶⁶ and specifies policy priorities on Higher and Postgraduate Professional Education. The LHE covers: (i) definitional issues; (ii) academic and research features, including standards, curricula development, types of programme, etc.; (iii) HE management, including licensing, attestation and accreditation; and (iv) HE financing. The LHE specifies three funding sources: state budget (directly and through Presidential Quotas), private funds (tuition fees) and other sources (e.g. donations, research and manufacturing contracts, educational services and international grants, which should not conflict with the charters of institutions and in any case remain small. As at 2015, there is only one private HEI in Tajikistan, which is entirely self-financed.

The 1994 *Charter of HEIs* set out the rights and responsibilities of HEIs within the wider HE policy context, and specifies their potential activities. The LHE prioritizes research as important for HEI accreditation, with academic staff obliged to allocate roughly 20-25% of their working time to research. Despite these limitations, the World Bank found⁶⁷ the law not to be a burden on ESLs, allowing revenues to be generated by research contracts.

Legislation on the Academy

The *Law on the Academy of Sciences of the Republic of Tajikistan* (2002, No. 52) defines the legal status of the Academy of Sciences and its members, their principles and activities, and the Academy’s competencies and responsibilities, including with regard to R&D. The law targets development of fundamental and applied science for scientific-technological progress, as well as economic, social and cultural development. *The Charter of the Academy of Sciences* (Article 6) sets among its main objectives development and coordination of basic and applied scientific research, and assigns the Academy responsibilities under the State’s

⁶⁶ 2003, amended 22 April 2009, No. 1314

⁶⁷ The list of HE-related laws and regulations is available in the World Bank report (2014, Annex 1)

Science and Technology policy. The Academy contributed actively to both the Law on Innovative Activities and the Programme of Innovative Development 2011-2020.

Law on Technology Parks (2010, Nr. 629)

Technoparks may be attached either to HEIs or the Academy of Science. Technoparks are legal entities supervised by an authorized state body, which determines the procedures applying to park-related expertise and innovative programmes and projects. Technopark objectives (Article 5) involve a variety of research organizations, nurturing knowledge-based firms involved in the commercialization of scientific results and managing technology transfer for HEIs or the Academy. Technoparks also have a role in training researchers, scientific and educational personnel in promoting intellectual capacities, commercial application of high technologies and technology transfer from abroad (Article 6). Technoparks may attract foreign investment, apply for grants and innovative projects and submit proposals to relevant international financial institutions. .

While this law permits universities to establish technoparks, it requires further development and implementation mechanisms. Science and education receive significant public funding, but there is no systemic view of how this fits in with the innovation process and the private sector for concrete financing arrangements. While many HEIs have technoparks, these in many cases do not function as was hoped. They are generally self-financed without state budget support and do not perform the full range of typical technopark functions. When registered as non-commercial organization it is hard to sell products to end users.

5.4 Legislation for business organizations

All laws that affect the business and investment climate are important for ESLs, with business interest in innovation a key precondition for active ESLs. Government agencies can facilitate such linkages but cannot replace business involvement. Where framework conditions favour investment and innovation, business can create demand for various types of ESLs. Three laws deserve particular attention: the Law on Innovation Activity; the Law on State Protection and Business Support and the Law on the Public Procurement of Goods, Works and Services.

Law on State Protection and Business Support (2002, No. 46)

While not specifically targeting ESLs, this law could help support the ESLs needed for implementation of the government programme on innovation, although allocation of the necessary financial resources is crucial. Article 14 empowers the authorized state body to implement state policy on business support, to design and implement entrepreneurship programmes, to submit proposals to the Government to establish business incubators and to promote the participation of entrepreneurs in the implementation of government programmes for innovation, investment and industrial development.

Law on Public Procurement of Goods, Works and Services (2006, No. 168)

This law devotes considerable attention to (mainly business-to-business) technology transfer. While criteria for evaluating innovation content are absent, Article 56 (Preparation of Terms of Reference) deals specifically with technology transfer, and provides some scope for ESLs: “If the goal is the transfer of knowledge or staff training, it should be specifically outlined along with detailed information on the number of staff to be trained, to enable consultants to

estimate the required scope of services.” FDI-related public procurement also enjoys some state support if domestic suppliers are involved. In Tajikistan, where FDI and adaptation-based technology are important, this legislation opens the door to ESLs involving domestic scientific actors. While this legislation is much improved, there remain significant shortcomings, such as a shortage of experts and appropriate implementation measures.

5.5 Policy initiatives and their implementation

There is a move towards competitive financing, but no clear mechanism to provide support to both applicants and evaluators, and it is not always clear why an examination committee either supports or rejects a project. However, this system will change with the planned introduction of expert evaluation of applications before Council deliberations.

The Consultative Council on Improvement of Investment Climate

This Council under the President has a significant role in setting the national policy agenda, and in initiating laws and programmes. The Council provides a mechanism for coordination between various policy actors and can make recommendations for legislation allocating financial resources for implementation. It then develops an Action Plan for presidential approval. Members of Council platforms are from both the private and public sectors and rotate according to session topics. For example, agriculture-related sessions have established a working group to improve the investment climate in food processing and agribusiness. The Council is also working on reforms to connect institutions. Academia has scientific results but no financial resources and there is inadequate economic collaboration, with a legacy “science-push” approach. Technology transfer functions are generally absent in Tajikistan’s scientific organizations, and the Council is considering possible workshops between science and industry (economy) to discuss specific topics.

National Development Strategy 2007-2015 (2007)

The NDS includes the strategy of scientific development and proposes to update the legislative framework for Science and Technology as well as implementation measures for legislation. The NDS declared Science to be a national priority, with an aim to integrate Science and Higher Education. The NDS also aims to strengthen cooperation between research organizations and various ministries and includes an ambitious programme for international scientific cooperation - through international agreements and treaties signed by the Academy of Sciences, industrial research institutes and universities.⁶⁸ The NDS highlights weaknesses in terms of funding, limited research/informational infrastructure, networking opportunities and highly qualified scientific personnel. At the time of this Review, the *National Development Strategy until 2020* (NDS 2020) remains a “work in progress”, but is expected to pay greater attention to innovation and related matters (including S&T).

A key element of *implementation* related to R&D and innovation was the establishment of a *National Centre for Patents and Information* (granting patents and dealing with intellectual property issues). Several committees were set up to implement innovation laws, strategies and

⁶⁸ M.I.Iolov, HM Akhmedov, F Fatulloev, SM Karimov (2014) “Национальная инновационная система Таджикистана: основные элементы и механизм развития (National Innovation System of Tajikistan: main elements of the mechanism for development)” *Tajikistan and Contemporary World Journal*, N 5(43), Centre for Strategic Research under the President of the Republic of Tajikistan.

programmes, e.g. National Council of Innovation under the Deputy Minister of Economic Development and Trade. However, an overarching implementation strategy for innovation remains lacking. The Ministry of Economy and Trade investigated NDS Programme implementation and established university technoparks, innovation centres at the Academy of Sciences and stand-alone science parks. However, the majority of such parks are not operational due to a lack of funds, while the majority of accepted innovation projects remain pending for the same reason.

Improved *implementation of innovation policy* and technological renewal of industry requires greater financial support from the state budget. Match funding for innovation and FDI could support economic development and improve competitiveness. Competitive allocation of project funding on the basis of clear policy targets will be important. To date, calls for project proposals have not included ESLs. Favourable treatment of foreign investors may also improve the attractiveness of the country.

National Strategy of Education Development until 2020

According to the National Strategy of Education Development of the Republic of Tajikistan (Decree of the Government 2012, No. 334), HE reform will include *multi-channel financing* on the basis of the diversification of financing sources, including *public-private partnership*, opening the door to ESLs from the financial side. Other targets, such as quality improvement and regional/international connectivity, will make HEIs better potential economic partners.⁶⁹ Under the Ministry of Education there is a Council on Technology, Information and Communications with tiers at the district and regional levels and a National Centre on Technology, Information and Communication. There are requirements for scientific research at HEIs and evaluation procedures established by the Ministry of Education and Science together with the Academy of Sciences. The *results of research evaluation and technical activities* of a HEI become a part of the general evaluation of the institution's activities for further state accreditation procedures.

Research is compulsory for academic staff at HEIs and generally represents 20-25% of their workload, as stipulated in the "individual plan" of staff members. HEI research is financed by the national budget alongside cost-effective contracts, bank credits, own resources, donations and other sources. State funding for research activities requires HEIs to present to the Ministry of Education and Science and other branch ministries a description of each topic and a research plan. The Ministry of Education then reviews the HEI proposal which, if accepted, is then presented to the Scientific Technical Council of the Academy of Sciences. If this Council takes a positive decision, the Ministry issues the order, and determines both the funding and deliverables. This does not guarantee the allocation of financial resources, as priority is given to research in line with national and regional priorities.

The state budget for HE remains limited, although it has increased from 0.13% of GDP in 2001 to 0.2% in 2008. Two financial instruments are applied at all levels of the educational system: input-based and per capita financing. In practice, the national HE budget covers 50% of student costs, with the remaining 50% coming from private sources, mainly tuition fees. In addition, the Government provides research grants, although individual grants are often less

⁶⁹ Tajikistan aims to integrate its Higher Education system into the European Higher Education Area (EHEA), which would require the development of a robust quality assurance system in alignment with the European Standards and Guidelines for Quality Assurance.

than \$5,000, or below the critical mass for research in many scientific fields. Ministry-issued research orders are often without corresponding financial resources.

Law on Science and State Science and Technology Policy

A first version of this Law was enacted in 1998 and amended several times, with the latest amendments still under development by the Ministry of Education and Science at the time of this Review. The amendment (2013, № 1007) to the original law contains ESL-related regulations, with Article 8 addressing agreements/contracts for the creation, transfer and use of scientific and technical products. Such agreements are between the public authority and the contracting organization performing the activity. For public research organizations, the Government can establish a mandatory state order to perform scientific research and experimental development. This Law also regulates the ethical issues of science and social responsibility which are important rules, not only for research but also for ESLs.

The funding structure of research at the *Academy* distinguishes three forms of research funding: basic, targeted and project funding. Under this Law, targeted funding is directed to the most important innovative large-scale studies, which should attract private funds and involve industry and/or SMEs.

Strategy of Industrial Innovative Development (SIID)

The implementation of the SIID has three stages: 2006-2010; 2011-2015; and 2015-2020. The principles of the SIID emphasizes the importance of ESLs. Two target indicators may influence the linkages (table 7).

Table 7. Target indicators (per cent)

Indicators	2007	2010	2013	2015
The share of budget expenditures on R&D to the total costs for R&D	82.9	89.6	96.4	94.3
The share of foreign investment in R&D to the total costs for R&D	1.5	2.3	2.8	3.5

Source: Ilolov et. al.

In the first stage some technoparks were created, e.g. at the technological universities. It is planned that, for 2014-15, applied research will increasingly be financed by private investors, which if successful will produce new ESLs. The Academy of Sciences designed the *Programme for the Development of Innovation 2011-2020*, which includes 30 different projects at the national level, of which 15 are involving institutes under the Academy of Sciences. Such programmes can help set strategic directions for development, but tend to be more focused upon academic research rather than innovation, with limited participation of industrialists and agricultural practitioners.

Law on Innovation Activity (2012, № 822)

Article 10 of this law mentions three objectives of state innovation policy related to ESLs: (1) Cooperation between science and industry; (2) International cooperation on innovation, the protection of national interests and intellectual property; and (3) A system of training,

retraining and advanced training of innovation specialists. Such horizontal objectives are an important way to identify priorities for innovation for development.

Article 11 contains the principles of State Innovation Policy, which include the integration of innovation, investment, scientific, technical and educational activities, as well as protection of the rights and interests of innovation and intellectual property. With regard to state support for innovation, Article 13 contains many indirect targets for supporting ESLs. Information from the National Legislation Centre confirms that this law was created before WTO membership and has been circulated among relevant stakeholders for feedback. The law includes the regulation of intellectual activities and will go before Parliament and the President in late 2015, with implementation measures to follow.

The WEF GCR ranked Tajikistan 95th of 144 countries for transparency of policy making.⁷⁰ Initiatives formulated in the programmes are rarely linked to implementation mechanisms, including state budget allocations. When such budget allocations are available, the ministries responsible alone (or jointly) for implementing the programmes have limited opportunities to reallocate financial resources among budget targets. There is an urgent need to find a better balance between policy priority setting and implementation.

5.6 Regulation and impact of existing intellectual property rights

Internationally accepted IPRs and country-level IPR organizations and expert capacities (e.g. patent attorneys, managers of intellectual assets) were largely absent following the collapse of the Soviet Union. IPR awareness was limited and IPR issues absent from educational curricula. Since independence, the process of establishing a national IPR system and awareness-raising has been characterized by modest steps, with support from international organizations such as WTO, WIPO and CIS. The third part of the Civil Code (2005) includes a section on "Intellectual Property". Since the mid-1990s, Tajikistan has enacted most necessary laws on IPRs. Since the first versions⁷¹ of IP related laws were enacted they were periodically modified to adjust to the international normative legal acts in the intellectual property sphere, including the normative legal IPR Acts of the CIS, although this adjustment process remains important and is ongoing.

According to Decree (2014, No. 691), the Government approved the *Agreement on Measures to Prevent and Suppress the Use of False Trademarks and Geographical Indications* (2000, No. 38). WTO membership (including TRIPs regulation) also highlights some criteria which the country must apply in the medium term. During the preparatory phase for WTO membership, Tajikistan accepted a *Programme on capacity development and intellectual property rights for the period until 2020* (approved by the Government 2012 № 687). The *Decree on the Programme of Adjustment of the Economy of the Republic of Tajikistan Related to Membership in the World Trade Organization* (2014, No. 691) contains detailed implementation targets for intellectual property rights by the competent authorities. Foreign technical assistance will largely come from Switzerland's Institute of Intellectual Property and State Secretariat for Economic Affairs, Economic Cooperation and Development (SECO) to

⁷⁰ Here and all other places in the text the source of Global Competitiveness Report is cited in: EBRD (2014) Transition Report, *Innovation in Transition* 2014 <http://tr.ebrd.com/tr14/tajikistan>

⁷¹ From the early 1990s many government orders addressed the protection of IPR before or after the relevant laws were enacted. The majority of these orders concern the preparation of legislation and set up relevant organizations, such as the "National Centre for Patents and Information" (2011, No. 497);

the various responsible ministries, the Customs Service, the National Patent and Information Centre and the Committee on Television and Radio. The most important actions are summarized in Table 8:

Table 8. Key Actions relating to WTO membership

Area	Required actions
Legislation	Further harmonization with provisions of TRIPS Agreement (2014-16)
Capacity building	<ul style="list-style-type: none"> • Increasing the capacities of the National Patent and Information Centre, the Ministry of Economic Development and Trade, and the Department of Copyright at the Ministry of Culture (2014-2016) • Increasing the capacities of other government bodies and their officials involved in IPR protection (ongoing) • Increasing capacities for implementation and use of Geographical Indications (2014-2015)
Improving IPR enforcement	Ongoing
Public awareness raising regarding IPR protection	Ongoing

These targets are detailed in the *National Strategy for the Development of Intellectual Property for 2014-2020* (2014). The *Regulation of the National Council for the Coordination and Development of the Sphere of Intellectual Property* (2014, № 767) established a Council to coordinate implementation of a unified state policy on intellectual property. As executive body, the Ministry of Economic Development and Trade facilitates this Council's work with relevant information and prepares work plans with the involvement of the relevant ministries and agencies. Reform efforts are showing results, with Tajikistan ranked 67 out of 144 countries for intellectual property protection by Global Competitiveness, and increasing numbers of foreign patent registrations. However, further steps are needed to follow international norms still more strictly. A reliable IPR legal system and law enforcement are crucial for the attraction of foreign investors, economic diversification and the protection of the intellectual property of Tajikistan abroad. A modern IPR legal system, enforcement and IPR awareness are basic conditions for ESLs. The Law on Geographic Origin and the Law on Plant Variety Protection have special importance given Tajikistan's assets in these fields.

In addition to improving framework conditions for IP enforcement, and of greater direct relevance to ESLs, are efforts to increase IP awareness and the creation of protectable values. The *National Strategy for the Development of Intellectual Property for 2014-2020* (NSDIP 2014-2020) (2014) includes ambitious targets for increasing *protectable values*. It stipulates that the Ministry of Agriculture, jointly with the Academy of Agricultural Sciences, should revive and intensify work on cultivating new plant varieties and their protection within the country and abroad, also helping to ensure food security.

IPR awareness will be raised through capacity building at government agencies, education and the mass media, with training of the young generation, scientific personnel and business actors particularly important. The NSDIP 2014-2020 highlights the following targets:

- To introduce a course on intellectual property into HEI curricula, develop relevant standards for different faculties, design a textbook on intellectual property and teaching aids in the Tajik language;
- The Ministry of Education and Science must make specific proposals for the introduction of a course on IPR protection into HEIs from 2015 and in senior high schools from 2016; and
- To use Special Funds of Research Institutions and HEIs (from central budget appropriations), to create centres/departments on intellectual property providing practical assistance to researchers, students, and professors in obtaining protection for objects of intellectual property, their deployment, and commercialization.

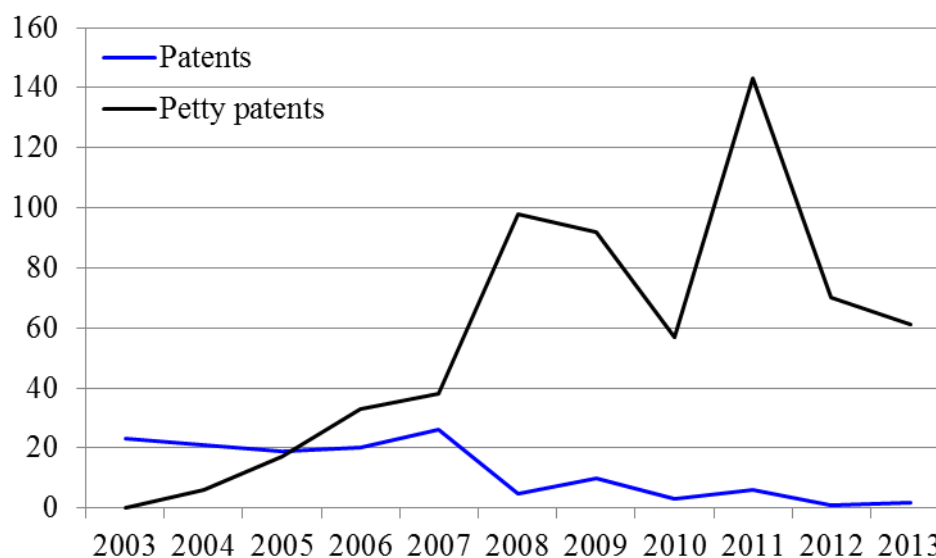
NSDIP implementation for ESLs will be in three stages: 2014 to 2016; 2017 to 2019; and 2019 to 2020. In relation to *awareness*:

- Annual training of Patent Office experts at the Russian State Academy on Intellectual Property, according to an inter-agency agreement.
- Patent Office seminars and conferences on IPRs and their enforcement.
- Outreach through the mass media includes talks, but needs further development.
- Patent Office short courses on protection of industrial property for HEI students and relevant ministries and departments in 2012.
- Specialist copyright activities in the cities and regions.
- Patent Office *Best Inventor Contest* every two years: winners awarded a WIPO gold medal, EAPO Blinnikov gold medal, and Patent Office medals and certificates.

Implementation targeting increased creation of *protectable value* includes the *organizational innovation* of a planned prototype technopark at a leading university for devising, introducing and promoting competitive engineering to the market, seeking to build on limited early attempts to establish functioning technoparks.⁷² There is limited implementation of IPR best practice at scientific organizations, where internal IPR regulations do not typically go beyond apportioning patent ownership and revenues between inventor and institute, with these percentages generally decided on a case-by-case basis at academic institutes and HEIs, and not specified in labour contracts. Institutes have some limited income from these sources. Numbers of both PCT and national patents are very low. In terms of PCT patent applications per million citizens, Tajikistan ranks 124th of 144 countries and is below the measurability threshold of the Global Competitiveness Index. Less rigorously evaluated national patents and petty patents (important for adaptation-based innovation), are also limited in number.⁷³ Over the last 15 years the number of patents and petty patents applied for has totalled some 900, with a smaller number actually granted (Figures 32).

⁷² The Law on Technology Parks was enacted in 2010 No. 629.

⁷³ Petty patents are generally issued for inventions that do not meet the requirements of ingenuity and novelty necessary for a full patent. In other cases, they are used to protect minor changes to an invention that already has a regular patent. (http://www.ehow.com/facts_6933869_petty-patent-definition.html)

Figure 32. Number of patents and petty patents granted for invention, 2003-2013

Source: National Strategy for the Development of Intellectual Property of the Republic of Tajikistan, 2014-2020.

The sectoral distribution of patent and petty patent applications is an important indicator of scientific strengths (Table 9).

Table 9. Distribution of patent and petty patent applications 2004-2013

Fields	Patents	Petty patents	Patents	Petty patents
	Distribution (%)		Number	
Medicine, veterinary medicine	44.3	35.2	81	331
Chemistry	14.2	10.2	26	96
Mechanics	9.8	13.8	18	130
Building, construction	5.5	5.2	10	49
Physics	5.5	4.7	10	44
Agriculture	4.9	12.8	9	120
Foodstuffs	2.7	7.0	5	66
Power engineering	4.9	5.1	9	48
Others	8.2	5.9	15	56
Total	100	100	183	940

Source: author calculations from *The National Strategy for the Development of Intellectual Property of the Republic of Tajikistan from 2014 to 2020*

Patent applications are particularly strong in medicine, chemistry and mechanics, with petty patents most frequent in the same fields plus agriculture. Of 183 patent applications, 113 (62%) were granted and from 940 petty patent applications 615 (65%) were granted over 2004-2013. Despite the high proportion of patent applications granted, annual numbers remain low, highlighting limited patenting and commercialization activities. Possible reasons include a lack of patent awareness and limited interest in commercialization at many scientific organizations, although some recent reform efforts on IPR, technology transfer functions and technoparks point towards patenting inventions and introducing technology transfer functions

at science organizations. A second factor is lack of business demand for intellectual property. Performing the activities summarized in the Action Plan of the NSDIP would be a major breakthrough in implementing targets.

The legislation provides an impressive basis for improved framework conditions, although the picture is less attractive in terms of implementation and enforcement. Important shortcomings include the lack of a road map for implementing legislation, including transitional laws and regulations, as well as limited understanding among experts and trainees of the meaning of laws and regulations. While data on the technological balance of payments are lacking, licence agreement data imply a significant imbalance. Between 1995 and 2013, only three registered licence agreements concerned national applicants, with 70 for foreign applicants, while the number of registered agreements for the transfer of rights was 2,169, of which only 54 were registered in the names of national applicants.

5.7 Policy targets needed for ESLs

A common feature of many programmes is a tendency to set an agenda without allocating the necessary financial resources, e.g. the Innovation Strategy calls for creation of a Fund for the Support of Innovation, but funding has yet to be allocated. In this sense all programmes relating to ESLs are drafts expressing the desired policy direction. Some have been the result of joint work with international donor organizations, which may support implementation. Draft programmes designed by one or several ministries serve as a basis for budget and policy negotiations across Government, and so the following programmes represent partial implementation of ESL policy targets.

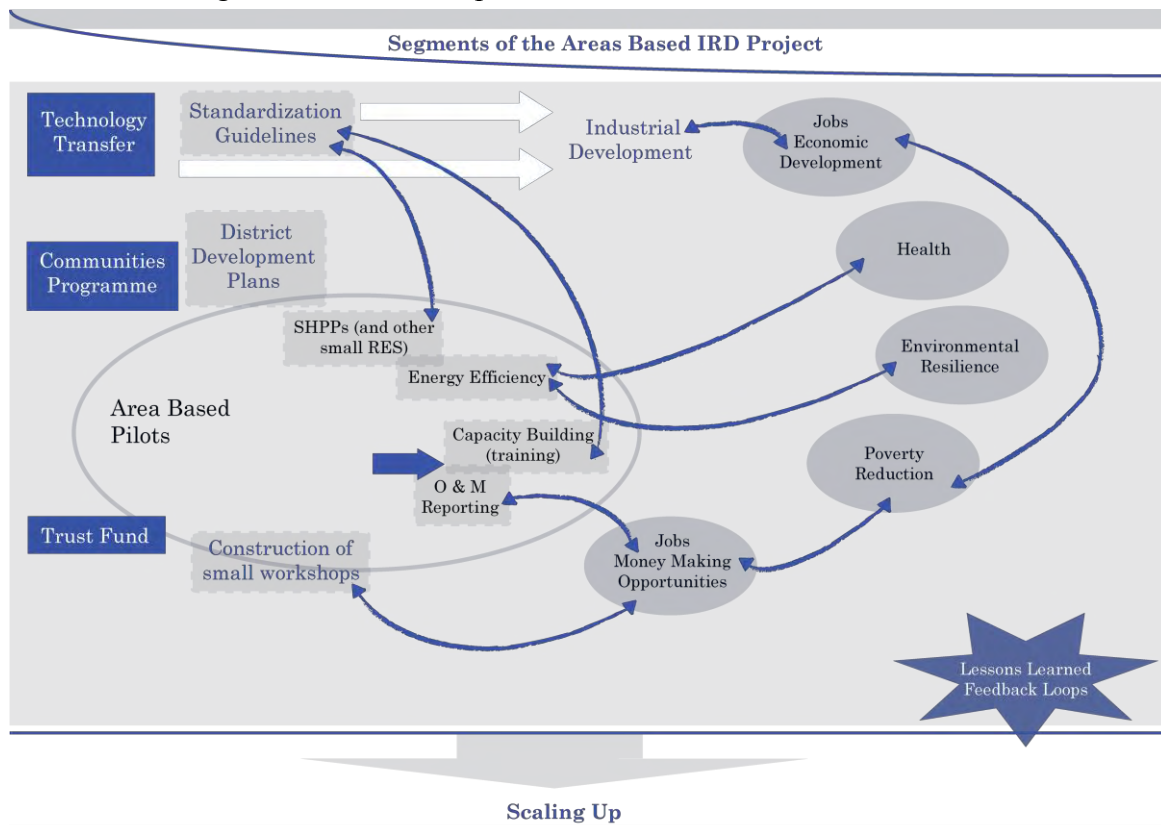
The *National Strategy of Education Development until 2020* plans to shift the focus of Higher Vocational Education Institutions towards participation in regional and national development programmes. Engaging in consulting and scientific and engineering development and using the intellectual resources of HEIs for territorial development may help regional development. The National Strategy on Innovations also plans to establish technoparks at universities based on territorial (sectoral) features, and to integrate HEIs, colleges, lyceums, gymnasiums and schools. The Strategy emphasizes the encouragement of private sector participation in education at all levels, including training on short-term courses. (Chapter 4) Funds will be attracted from various sources, including resources from public-private partnership for the renewal and development of educational institutions. It includes an important implementation indicator for evaluating progress in ESLs: an increased share of enterprise financing in Higher Education. This Strategy takes a supply-side approach with the scientific organization the key actor in commercialization, without proposals to other ministries on incentives to business organizations for using university knowledge in innovation. Initial public financing can help public-private partnerships develop, while tax deduction and other indirect support can also assist this process. The Law on Public Procurement of Goods, Works and Services, discussed earlier, contains some financial incentives for foreign investors if they cooperate with domestic partners, but there is no similar incentive for domestic ESLs. Such incentives are crucial to reach the expected results for 2020 relating to ESLs, e.g. commercialization of research results, creation of knowledge-based small enterprises linked to HEIs, etc.

Chapter 7 treats the role of international cooperation in promoting innovation more fully, but here we highlight a UNDP programme (Box 1) that is a good example of linking a technology import based development programme to local actors, among them universities, to help improve economy-science linkages.

Box 1. Sustainable Energy for Tajikistan – Integrated Rural Development

The on-going UNDP project links a technology import-based development programme to local actors, including universities. This project has four interconnected objectives: enhancing the regulatory framework; transferring technology related to Small Hydro-Power (SHP) production units and market development; piloting and scaling up.

The UNDP/GEF project “*The technology transfer and market development for SHP in Tajikistan*” is the offshoot of the fully UNDP-financed “*Promoting renewable energy sources*”. The “*Integrated Rural Development model*” was introduced under the latter project and further scaled up under the *Sustainable Energy for Tajikistan – Integrated Rural Development* (diagram below). The projects are interconnected as technology transfer builds on the success and the initiatives underlying the promotion of the Renewable Energy Sources project. Tajikistan serves as a pilot country to support the UN Sustainable Energy for All (SE4All) initiative. The programme contains some elements of ESLs, effectively playing a “match-maker” role. The arrow in the diagram below seeks to illustrate the entry point for ESLs into the Integrated Rural Development Model.



Source: Government of the Republic of Tajikistan and UNDP 9/11/2013

Initial steps in ESLs and technology transfer

One module of these complex socio-economic projects is the involvement of Higher Education in supporting technology. Education modules on Small Hydro-Power construction and maintenance were developed and introduced to the curricula of the Technological University of Tajikistan (TUT) and the Kurgnatyube Energy Institute, where 100 students annually undertake courses on SHP development and management. These are based on modules developed under the Sustainable Energy for Tajikistan project. TUT is also involved

in vocational training for SHP technicians - in collaboration with the Croatian company Komperg - during the construction of four SHPs planned for 2015 and 2016. Local manufacturers and TUT receive tested and adapted solutions from Komperg. During this transfer process, none of the Tajikistani science organizations has a role in supporting adaptation through R&D. All technical documentation and designs are provided directly to Tajikistan's technical HEIs which may then be provided to firms for replicating the products. This solution helps Tajikistan to keep the WTO (TRIPs) rules. Universities can intellectually support the legal reproduction of equipment without involvement in reverse engineering.

5.8 Role of ESLs in development

Policymakers are paying increased attention to encouraging ESLs. Patent applications and approvals illustrate only one dimension, representing potential rather than actual commercialization. A key hindrance is that industry, as well as agro-farms, have limited innovation capabilities, alongside limited technology transfer capabilities. FDI may create demand for inventions, but it remains limited in Tajikistan. Foreign companies have yet to establish research centres in Tajikistan and usually work with their traditional (foreign) science partners to adapt their technologies.

In current innovation-leader economies, sophisticated ESLs are the result of a 150-year journey from isolation to collaboration. Tajikistan can progress faster by learning from internationally-visible trends in broadening the missions of universities and changing innovation models of business organizations leading to wider and deeper ESLs.

Industrial capabilities for innovation: creating demand for new knowledge

Industrial development has been slow, both in Soviet times and since. The economy remains raw material-based with limited manufacturing. However, even when raw materials are available, e.g. for textiles and food processing, there is very limited suitable plant and equipment, which is often outdated, and a lack of external financing, which hampers modernization through adaptation-based innovation and ESLs. Consequently, a significant number of companies have closed. Of course, there are exceptions, such as the Dushanbe Dairy Factory, as presented later (Box 2).

In addition, a number of companies have successfully modernized, often supported by foreign financial resources. The foreign technology that has penetrated has been through imports, support by international donors, and also through FDI. However, the latter remains limited, with a net FDI to GDP ratio of between 0.3% and 3.1% over 2011-2014,⁷⁴ with FDI still individually arranged between government agencies and investors. FDI may have a role in technology transfer, but there are no incentives for collaboration between FDI and local science or business actors. Import-related, adaptation-based innovation may create some demand for ESLs, with adaptation itself usually requiring some external knowledge. Demand from foreign investors for local knowledge is very limited. Regarding business sector innovation, the *Chamber of Commerce* searches investors in priority areas, as well as supporting technology transfer to create new SMEs. Tajikistan has a better position in terms of capacity for innovation (62nd/144) than for FDI and technology transfer (101st/144) or for company-level technology absorption (117th/144).⁷⁵

⁷⁴ EBRD (2014) Transition Report, Innovation in Transition 2014 <http://tr.ebrd.com/tr14/tajikistan>

⁷⁵ Global Competitiveness Index.

5.9 HEIs for ESLs

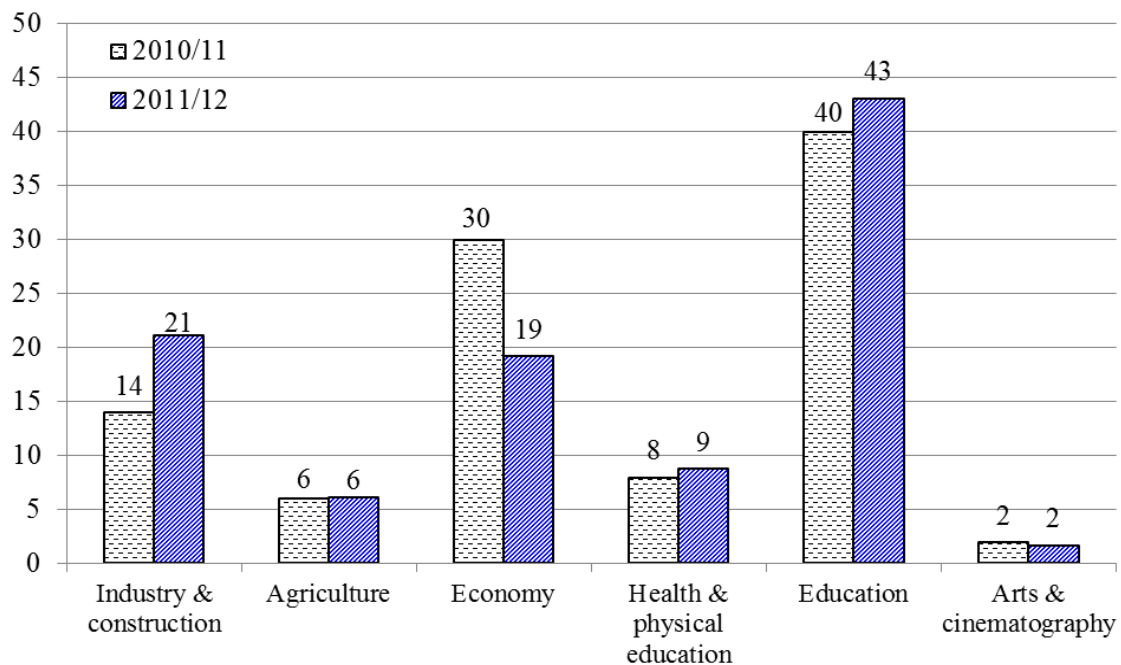
In addition to education and research, HEIs may also have a *third mission*, involving relationships with society and the economy. From historical experience of developed countries, agriculture and engineering universities are often pioneers of ESLs.

Education

Of the three missions, *education* is universally present. A university's task is to provide a well-educated workforce, but to fulfil this requires some linkages between universities and economic actors. ESLs relating to education are present in Tajikistan, with the most important linkages relating to educating and (re)training human resources, which is vital for the advancement of the economy and society. More talented students and/or those with greater financial resources can enter fee-paying education, while others enter the non-fee-paying sector. Better qualified professors also teach on fee-paying courses to earn additional salaries.

Although the number of HEIs significantly increased from 1991 (13) to 2014 (35), the majority of HEIs are located in the Dushanbe region with affiliates in Kathlon and Sughd. Between 1991 and 2013, the number of enrolled students more than doubled (in 2013: 150,100) and faculty members almost doubled (in 2013: 9,950).⁷⁶ The enrolment rate of relevant age cohorts to higher education is low by international standards, but there is a graduate labour force available for upgrading and diversifying the (limited) industrial base. However, some of the education curricula have no relevance to the economy and several important subjects are missing, despite recent progress. Given the importance of agriculture, the subject structure does not fit the country's economy (Figure 33).

Figure 33. Distribution of students by subject, 2010/11-2011/12



Sources: Ministry of Education, 2012, Statistical Collection Sphere Education: Republic of Tajikistan 2011-2012; Ministry of Education and Tajikistan in numbers, 2011 and 2012

⁷⁶ TajStat

Adjusting teaching curricula to market needs

The Technological University of Tajikistan (TUT) has analysed employer requirements and adjusted its curricula. The university established a Ukrainian- Tajikistani faculty in some fields of engineering - a good example of how international collaboration can be mutually beneficial and help overcome structural discrepancies. To improve students' proposal skills, TUT students must submit a project proposal every six months to a competition. Each faculty publishes a compendium of proposals, some of which have now been commercialized. The *Agrarian University* established an Agribusiness faculty in 1997, with teaching curricula including marketing, techno-economic management and cold storage of fruit and vegetables. Other faculties also revised their curricula to meet business needs.

Educational quality, in particular developing and retaining well-qualified teaching staff, is essential. A World Bank report⁷⁷ found ICT specialists educated at several HEIs lacked key employability skills. Nonetheless, curriculum modernization is underway, with HE graduates much better positioned on the Tajikistani labour market than less-qualified people, with some 90-95% of graduates from leading universities employed or continuing their education at a higher level. TUT has a student mentoring centre for the labour market. While many specialists leave the country for opportunities abroad, these migrants may also bring accumulated knowledge and skills back to the country. Leading universities of Tajikistan have many bilateral and international agreements with other HE organizations, but implementation is hindered by language problems. Few professors and students can communicate in languages other than Russian, which is why relations are weaker outside the CIS.

Training and retraining programmes for business organizations

Training and retraining programmes are important both for a better trained (upgraded) workforce and for establishing ESLs. The UNDP/GEF "Technology transfer and market development for SHP in Tajikistan" project includes education modules introduced to the curricula of TUT and the Kurgnatyube Energy Institute. HEIs are effectively replacing a missing actor: vocational training organizations with sufficient expertise.⁷⁸ The CISCO Academy – organized by the technology company CISCO Systems – is involved in training ICT specialists. The company equipped a modern ICT laboratory at the University of Technology for education and training, enabling students to participate successfully in an EU FP7 project. In certain domains, student practice at businesses is increasingly part of the curriculum.

Research

The research agenda and ESLs differ between so-called "think-tank" and "do-tank" universities, with ESLs generally stronger and wider at "do-tank" universities, although breakthrough innovators may create linkages at "think-tank" universities. Some forms of ESL can be present in the (currently predominant) case of adaptation-based innovation with the key potential partners of economic actors being "do-tank" universities. HEIs in Tajikistan are

⁷⁷ World Bank (2014) Republic of Tajikistan, Tajikistan: Higher Education Sector Study; GEDDR, Europe and Central Asia, Report No: ACS10383

⁷⁸ OECD Report, 2011 (*Developing Skills in Central Asia through Better Vocational Education and Training Systems, Policy Handbook*, Private Sector Development, OECD, Paris) has identified the problems of Tajikistan's vocational education.

still mainly teaching organizations with increasing research activities, mainly carried out as a part of education, with students supervised in co-working with professors. The research agenda is practice-oriented at “do-tank universities” (e.g. Agrarian University, University of Technology). This is rational since it produces highly employable graduates. At the *Agrarian University*, 180 researchers and many Masters and part-time PhD students are working on various practice-oriented research tasks linked to priorities in the agrarian sector. The University has developed new types of cotton and wheat and, following government permission, “bio” potatoes. At TUT, research practice is also an important part of education. Some students have patented inventions (e.g. marinated tomatoes, various oils, testing methods for food safety, etc.). Stand-alone research may be found in the technopark.

Third mission

The *third mission of universities* includes linkages with the economy and society, with its economic aspect covering five dimensions (Table 10).⁷⁹ There remain capacity problems at scientific organizations, with the level of scientific equipment and instrumentation being very mixed. Modern equipment is available by donation, and several laboratories are well equipped from these sources. Access to professional literature is limited due to a lack of financial resources, limited knowledge of foreign languages and low Internet penetration. The seasonal shortage of electricity also has a negative effect on R&D laboratories. However, despite shortcomings, we may find good examples across four of the five dimensions in Tajikistan. Further implementation of the laws and policy programmes, as well as further changes in legislation and governance to fill the gaps, remain necessary. Without direct (official) research linkages between HEIs and firms, we may not expect significant upgrading in ESLs. These linkages are still indirect; going through relevant ministries by virtue of the inherited vertical Soviet model. There are rare examples of collaboration between Tajikistani universities and foreign firms. The *Agrarian University* has an agreement with a shareholding company in China to test maize and cotton in regions of Tajikistan with different climates. The University tests without a fee as the Chinese company provides the seeds free of charge.

Table 10. Third mission university characteristics in Tajikistan

Dimensions (in context)	Overall characteristics in Tajikistan	Good examples
1. Human resources: transfer of embodied knowledge in PhD graduates. Modified criterion: knowledge transfer is visible in bachelors and masters graduates.	No evidence industry or agriculture employs PhD graduates, but bachelors and masters graduates' inventions may be introduced when graduates employed by firms.	<i>Agrarian University</i> : compulsory six month placement for students, either in companies or in public organizations, which may be a future employer. <i>Technological University (TUT)</i> initiative sending groups of students with an expert to cities/districts to work with enterprises.

⁷⁹ Inzelt et. al. 2006 Third Mission” in Observatory of European Universities: Methodological Guide – Strategic Management of University Research Activities, PRIME NoE, FP6

Table 10. Third mission university characteristics in Tajikistan (continued)

Dimensions (in context)	Overall characteristics in Tajikistan	Good examples
2. Intellectual property: codified knowledge produced by the university. Dual role of management: exploitation of scientific results and making universities attractive for research investment.	Intellectual property and management very limited. Initial steps to develop these managerial capabilities (e.g. trial technoparks)	<i>TUT</i> : some inventions patented (or patent pending) <i>Agrarian University</i> : Shared income from licensing patents to agribusinesses. <i>Institute of Entrepreneurship and Service</i> regulates income-sharing from IP. Institute receives nothing if invention created outside (in other employment or private time). If staff member made invention using institute time/equipment, income shared according to cost to institute.
3. Spin-offs: knowledge transfer through entrepreneurship	Spin-offs not legally excluded, but many conditions to formalize lacking: entrepreneurial spirit, management support, seed capital.	No known examples of invention-based establishment. Some new graduates establishing own businesses based on accumulated knowledge (University of Technology), but not linked to university.
4. Contracts with economic actors are linkages at different stages of the capitalization of knowledge. Contracts indicate the attractiveness of university to economic actors.	Few contracts may be registered R&D service is common at universities. Testing the quality of food is an important task for several universities (and institutes of the Academy of Sciences).	If quality of food, health or medical products disputed between organizations, either <i>TUT</i> or <i>Agrarian University</i> is asked to test. The role of the <i>Agrarian University</i> is to test products invented elsewhere. If the product is well evaluated it is recommended for market introduction. Relating to Government cold storage programme, university tests established at centres in different regions.
5. Contracts with public bodies. University involvement varies from safety standards (nuclear safety, food safety) to developing rules on clinical trials.	Linkages with public bodies exist R&D service tasks (testing product quality, checking safety, etc.) usually ordered by ministries or other governmental bodies and are not typical contracts. Examples include rules for clinical testing (or for nuclear power stations) and commercial contracts. Should consider introduction incentives and facilitate direct ESLs with private sector.	

For domestically-owned firms it is also useful to collaborate with the university for development, testing, etc. Dairy firm “Molochniy Kombinat” is a good example of the relevance of R&D contracts in a low-tech industry for adaptation-based innovation (Box 2).

Box 2. Dairy firm “Molochniy Kombinat”, Dushanbe

The firm spends 20-30% of net income on technological modernization and 3% on R&D. The factory was fully modernized in the 2000s. The processing line was imported from Hungary (a cheese and yogurt production line), the Czech Republic (milking device) and Russia (sausage-cheese production machine). Both product and process innovations are adaptation based, with innovative products offered by Hungarian collaborators. Agricultural raw material (milk) is also an adaptation-based innovation: cows were imported from Germany with a significant increase in yield to 40 litres/cow/day from more usual levels of five litres/cow/day. The enterprise upgrading positively impacts research capabilities of institutes/experimental farms of the Academy and on future ESLs. Apart from these knowledge and capability imports, there is still room for research (service) collaboration. For the company it is crucial to invest in food safety technology to exclude diseases and achieve international export standards. The company has collaborated with the University of Agriculture (on dairy issues) and the University of Technology (on manufacturing processes). Foreign scientific organizations are also among the partners (a Russian research institute on dairy products and an Iranian partner). Adaptation-based innovation is hampered by customs tariffs. The company cannot bring in more highly productive cows since the customs duty is 40%.

Generally speaking, the third mission is in its fledgling status at universities in Tajikistan. One ranking indicator of the Global Competiveness Report illustrates well this situation: Tajikistan ranks 91st (of 144 countries) by university-industry collaboration in R&D.

5.10 The Academy as a Science actor

Institutes of the Academy of Sciences were responsible for research in the Soviet model instead of universities, with their function mainly basic with some applied research. They were and are still involved in doctoral education. “Innovation” became a buzzword in academic circles, but much international collaboration on “innovation” is simply scientific collaboration. This may have some influence on innovation, but in reality is far removed as none of the partners is a profit-oriented business. The Institutes of the Academy face similar capacity problems to HEIs. Some of the laboratories are obsolete and the critical mass for research is missing in financial and personnel terms. Capacities are not well understood, and an evaluation of laboratories and institutes would be useful for science and innovation policy, as well as for building partnerships and linkages with both other scientific actors and businesses.

An important organizational innovation was recently performed, with two divisions (Physical-Mathematical, Chemical, and Geological Sciences and Biological and Medical Sciences and Innovation) setting up centres for innovation in 2011-2012. The Division of Social Sciences does not have such a Centre but The Institute of Economics has been involved in projects studying the implementation of innovation policy, including one on the ESL topic: the commercialization of innovation through small businesses. In rare cases, if a company is participating in academic research, it has to set up a temporary research group for joint research between academic and company employees under the Civil Code. Masters and PhD students at the Academy are educated for scientific positions and entrepreneurial studies are not in their curricula.

5.11 Science parks/technoparks

In accordance with the *National Strategy for the Development of Intellectual Property for 2014-2020* (2014), the *Law on Innovation Strategy*, and the *Law on Technology Park (2010, Nr. 629)* several universities established technoparks, while two divisions of the Academy set up innovation centres. The main aims are to support the innovation performance of Tajikistan through commercialization and other activities. Implementation is at an early stage: for internationally successful parks, the introductory phase has typically been five years. The university technoparks and the Academy's innovation centres have yet to generate spin-off firms. However, the law allows staff members to work at spin-offs as long as external activities do not conflict with their work at the university or centre. Some laboratories may be found working on applied research, experimental development and producing prototypes.

Technoparks at universities

Three different Technoparks can provide good examples. Two of these have some practice-oriented laboratories focusing on “near-to-market” research, with a third at the Institute of Entrepreneurship and Service producing traditional goods that are marketable.

Technological University of Tajikistan

Lab 1 is devoted to technological automation and has produced a solar-powered car, an electric cradle, an electric butter churn and so on, although product marketability is doubtful. However, as the results of research-education, these were very useful tasks for acquiring experience of technology design. Students can learn through practical tasks the automation technology for developing further products for everyday life. Designing for the automobile industry is an attractive task for students all over the world, and a solar energy car might be a good label for Tajikistani science production at fairs and student competitions. The designed car (with many imported parts) can demonstrate well the engineering research capabilities. The main problem for ESLs is that Tajikistan does not have a car assembly or components industry, or solar panel production. While these are present in neighbouring countries, there is limited interest in further development on the basis of a successful Tajikistani imitation.

Lab 2 is for software design, working on the automatic translation of Tajik texts and computer security programmes. This lab has much better chances of product commercialization. Capability accumulation, in the form of education through research practice in the technopark, is a valuable asset for both graduates and firms. The employability rate of students is very good (above 90%) and firms can acquire up-to-date knowledge.

Agrarian University

The University of Agriculture has a technopark that includes 23 testing areas (lemon groves, varieties of agricultural produce and a fish farm). Sometimes only teaching staff can buy the products at a non-commercial price because of the lack of permission for commercialization. The technopark has a good laboratory for cartography and water treatment, and is planning to establish an agrochemistry laboratory.

Institute of Entrepreneurship and Service

The Institute's technopark produces touristic souvenirs, mainly from locally-made handicrafts. These are not innovative products *per se*, but are marketable and could support Tajikistan's tourism potential. However, according to the *Law on Technoparks*, Institute workshops cannot sell or market their products outside the institute as the technoparks are classified as non-commercial organizations.

There is a general need to amend the Law on Technoparks to remove such restrictions on sales, while introducing other incentives for ESLs. Current technoparks cannot solve the technology transfer function to upgrade to "third mission" universities. Improved commercialization capacities and economic linkages remain to be addressed, either inside or outside the university technoparks. Park leadership should depend on the main function of the technopark, e.g. researchers for a research-oriented technopark, or commercial managers where the goal is to support spin-offs, commercialization, patenting and licensing, managing contracts, etc.

Innovation Centres at the Academy of Sciences

The following centres were founded in 2011:

- Centre for Innovation and New Technologies (within the Division of Physical-Mathematical, Chemical, and Geological Sciences); and
- Centre for Medical and Biological Innovation (within the Division of Biological and Medical Sciences and Innovation)

The first stage was to develop infrastructure, with support including foreign aid. The Heads of the Centres are well-known scientists, educators, research leaders and supervisors of PhD students but, as at technoparks, managerial capabilities for technology transfer are lacking.

Five "innovation" projects are running within the Centres, with state financial support. The Centres aim to identify innovation-related topics in their fields of research, and influence the Academy's wider research agenda. Such topics include biosafety, particularly of medicines and cosmetics based upon local herbs and animal products, and non-traditional energy sources for improving electricity supply in remote areas. For applied research or experimental development topics, funding applications must contain a signed agreement with an enterprise, although if a governmental agency is the potential user, it can issue a special order.

Centre for Medical and Biological Innovation

The Centre was set up mainly with resources from the Academy's regular (state) budget, and approved by the Ministry of Finance (covering salaries, office materials and miscellaneous items), with limited external support. The Centre needs to be properly equipped and a grant of around \$20,000 has been provided by UNESCO.

It focuses on research into innovative biotechnological criteria and approaches to food and biological safety and has two laboratories:

- Biological safety and security; and
- Biomedicine

The aim is to increase food security and develop the domestic agribusiness sector. Where changes to chromosomes are found to have occurred, this is referred to as a GMO. At the Institute there is no genetic engineering research other than selection from chemically-accelerated and natural mutations, but they do test foods. Tajikistan has a unique geography and climate and there is a cultivation station at 2,100 metres above sea level to test crop performance. A production laboratory has been set up to produce “bio compost” for agricultural land, with UNDP and the Global Environment Fund (GEF) support. This could lead to commercialization and help reverse soil degradation on previously over-exploited agricultural land that was under cotton production. There is also adaptation-based technological development to combine bio-compost products with “drip irrigation” techniques (as used in Russia, Belarus, United Arab Emirates and Israel), but financial support is required. A Russian pharmaceutical company is pursuing commercialization based on a Centre invention, with a contract signed by the President of the Academy.

Centre for Innovative Development of Science and New Technologies

The Centre deals with the development and application of renewable energies, with the exception of hydro energy. Projects include the development of solar panels and collectors in the Pamir region, as well as biofuels. This project with European partners was grant-supported by the EU with the role of Tajikistan to test novel solar panels at different altitudes and weather conditions. The Centre’s mission includes disseminating information on these alternative energies and their usefulness for remote regions. There are no available national resources to organize training seminars and awareness is therefore a precondition for commercialization. A Department of Management was recently established and is responsible for commercialization and other technology transfer matters.

The Centres are at an early stage of development, with key ESL functions missing. The Technopark of the Academy of Science is a registered legal entity that would be a potential partner to support spin-off activities (e.g. bio compost products), but does not operate due to a lack of financial resources. There is a need to bring in technology transfer and commercialization managers with the appropriate skills, including possibly from abroad.

5.12 Taking stock of early stage ESLs

Table 11 summarizes the existing forms of E(I)SLs in “third mission” terms, indicating forms of linkage found in at least one organization, even if only at an early stage.

Table 11. Existing forms of ESLs by dimension

Dimensions	HEIs	Academy
Human resources	Present?	
PhD students: <ul style="list-style-type: none"> - Supported by industry/agriculture - Contract with industry/agriculture - Going to industry/agriculture before/after degree - Joint supervision of PhD and master theses by university/academy and firm members - Students (any level) supported by industry/agriculture 	No	No
Practical training at firm/agricultural farm during education	Yes	Yes

Table 11. Existing forms of ESLs by dimension (continued)

Dimensions	HEIs	Academy
Intellectual property	Present?	
Active patents owned by university/academy Joint IPRs by university professors/researchers of Academy and firm employees	No	No
Patents produced by faculty members, students/researchers at Academy	Yes	Yes
Returns for the university; licences from patents, copyright	Yes	Yes
Proactive policy (patent office, transfer office)	<i>Preparatory phase</i>	
Spin-offs	Present?	
Presence of Technoparks, science parks	Yes	Yes
Spin-off firms funded by universities/Academy Presence of incubators Incentives for firm creation Seed capital funding	No	No
Contracts with industry	Present?	
Contractual, formal R&D cooperation for knowledge acquisition	Yes	Yes
Ad hoc partners acquiring university/Academy research	Yes	Yes
Formal R&D cooperation for joint research projects Sharing of specialized/expensive research equipment	No	No

Source: Author compilation on basis of documents and interviews.

Missing ESL dimensions are not of equal importance. Presence of technoparks is a good sign for possible ESLs but they remain far from hosting spin-off firms or incubators. Formal cooperation with industry is scattered, with the question being whether the number of contracts will increase and widen their R&D contents, or will the situation stagnate. It is relatively urgent to include technology transfer functions in the recently established structures at HEIs and in divisions of the Academy if there is to be commercialization of practice-oriented research and R&D services for adaptation-based innovations by business organizations.

5.13 Recommendations

Few economy-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;*
- *Evaluating existing technoparks, identifying lessons learned and promising candidates for targeted support to develop spin-offs, incubators and technology transfer capacities, potentially drawing on foreign expertise;*
- *Reclassifying technoparks from non-commercial organizations to not-for-profit organizations, thereby strengthening their rights to sell their products; and*
- *Providing specific support to the 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 Tajikistan's scientific performance and capabilities in existing fields (R&D organizations/departments) against 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;*
- *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; and*
- *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 possessing the 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 could organize a series of workshops where economic and scientific actors discuss relevant topics; and*
- *Organization of events to upgrade knowledge of scientific performance and options for their applications targeting policymakers, civil servants, business people, students and the public.*

Recommendation 5.5

There is a need in the medium- to long-term to increase awareness of intellectual property rights, and the 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

PROMOTING ENTREPRENEURSHIP AND THE FINANCING OF INNOVATIVE BUSINESSES

This chapter first presents an overview of Tajikistan's progress on the three key enabling factors of innovative entrepreneurship - quality of business environment, institutional quality, and financing of innovative businesses. The second part analyses and evaluates reform efforts for innovative entrepreneurship within the country's regulatory framework and with regard to implementation capacity constraints. The third section is devoted to the structure and development of the financial sector and related policies with special regard to factors affecting access to finance for innovative businesses. The fourth and final part includes recommendations in the above outlined agendas, reflecting both current achievements (in Tajikistan and comparator countries) and implementation capacity constraints.

6.1 Factors of innovative entrepreneurship

Business environment is a key enabling factor of innovative entrepreneurship, and is both directly and indirectly affected by institutional quality. Policies and conditions for financing innovative businesses are also shaped by these factors. This triangle includes both so-called basic requirements and efficiency enhancers of country competitiveness. Basic and efficiency enhancing elements have been underdeveloped compared to average scores in the CIS region, limiting the scope and impact of innovative entrepreneurship. There have been some recent improvements, but these have yet to result in a visible increase in entrepreneurial activities, most specifically those with innovative intensity.

Business environment

Successful innovation by a firm relies on a supportive business environment. A poor business environment can substantially increase the costs of developing new products and make returns to innovation much more uncertain. The Business Environment and Enterprise Performance Surveys (BEEPS) reveal that firms that innovate by introducing one or more new products are more sensitive to the business environment compared with non-innovating firms.⁸⁰

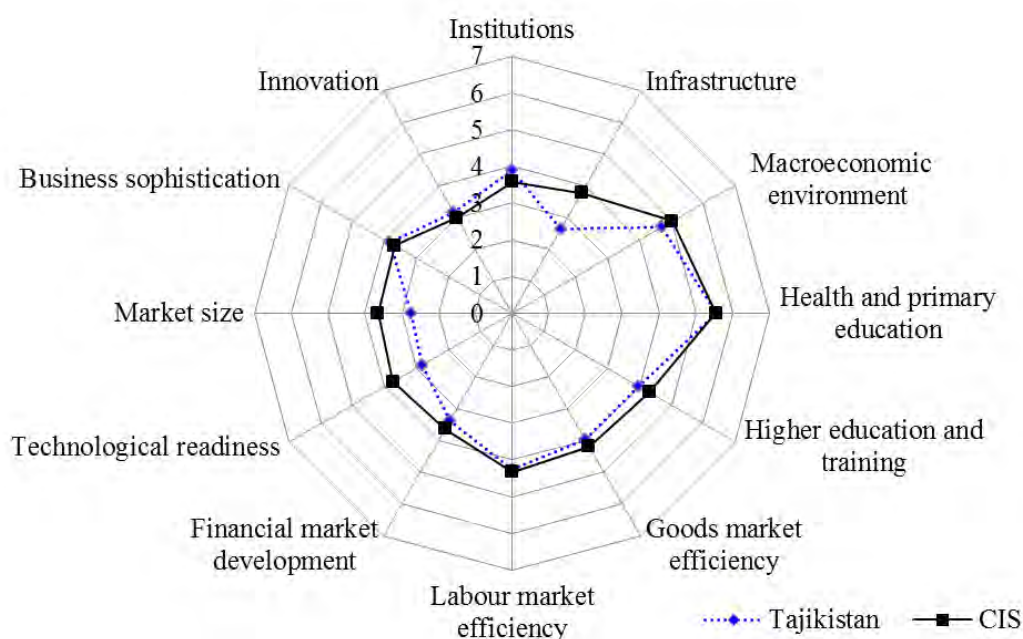
The WEF Global Competitiveness Index (GCI) characterizes Tajikistan as a **factor driven economy**, i.e. not yet in transition to the efficiency-driven stage of development. In comparison to CIS countries, the largest Tajikistan competitiveness gaps are identified in infrastructure (one of so-called basic requirements), and then in two efficiency enhancers: market size and technological readiness. Gaps in two other important efficiency enhancers are identified as financial market development and higher education and training. The CIS region as a whole lags most significantly in innovation competitiveness (Figure 34).

Financial markets are considered as one of the key efficiency enhancers, as defined in the GCI. In the case of Tajikistan and other CIS countries we consider the following **chain of**

⁸⁰ EBRD, Transition Report 2014, Innovation in transition, p. 45, <http://goo.gl/eKtXB9>, retrieved on 15.3.2015

competitiveness factors as crucial: quality of institutions (basic requirement), financial market development, technological readiness, and quality of higher education and training. The **most problematic factors** for doing business in Tajikistan mentioned by GCI responses were: access to financing (20.5%), corruption (17.7%), tax rates (15.8%) and tax regulations (15.4%). By comparison, insufficient capacity to innovate is considered most problematic for doing business only by 1.4% of respondents, with institutional quality and financial market development (including the tax system) seen as more important.

Figure 34. Pillars of competitiveness in Tajikistan and CIS region, 2014



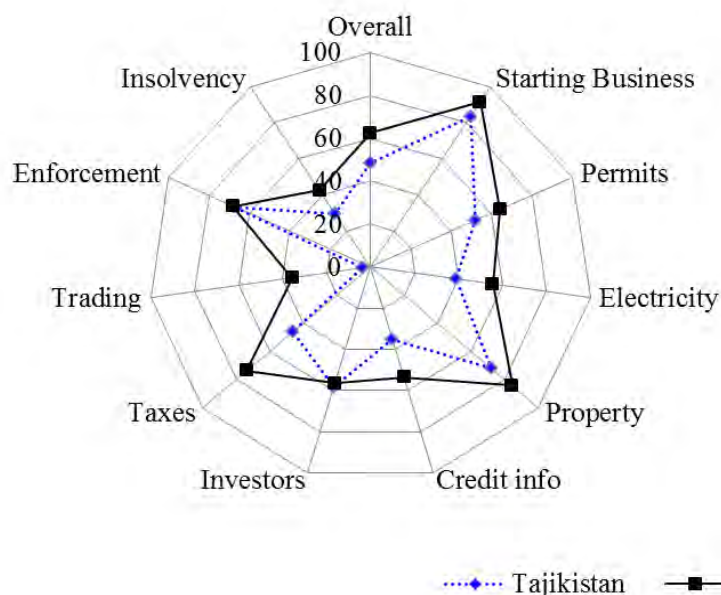
Source: Global Competitiveness Report, 2014-2015, WEF Database, <http://goo.gl/EnZOF5>, retrieved on 20 March 2015. CIS averages exclude Belarus, Turkmenistan and Uzbekistan.

The methodology of the World Bank **Doing Business** survey differs, yet outcomes are quite coherent with the GCI. Measured by distance to frontier scores (between 0 to 100 as the best value), the worst are the scores on access to finance (measured by getting credit information) and paying taxes. However, the positive aspect is that the scores improved rather markedly in 2013-2014, with Tajikistan being recognized as one of the top ten “improvers” overall, having made the biggest advance of all countries towards the regulatory frontier. Improvements were recognized particularly in the ease of starting a business, dealing with construction permits, getting credit and paying taxes. Despite these improvements, the gap remains large, even compared to the CIS average (Tajikistan: 48.6, CIS: 61.0), and again in financial market characteristics (resolving insolvency, paying taxes, getting credit). In addition, while the CIS scores poorly on credit information, Tajikistan lags even further behind (Figure 35).

The aforementioned obstacles are confirmed by the World Bank/EBRD **Enterprise Surveys** (undertaken 2008 and 2013), which find the most important constraints to be: access to finance, tax rates, tax administration, corruption and electricity connection. Besides surveys, data on business demography complete the unfavourable picture. In 2012, Tajikistan had the lowest number of new limited liability companies established in 2012 in the region. Tajikistan

also had the lowest **new business density**⁸¹ in Eastern Europe and Central Asia, with a value of only 0.26, far below the region's median value (0.92). On a more positive note, the recent reform efforts recognized by the World Bank's Ease of Doing Business Report appear to have resulted in an improvement in the business density indicator.

Figure 35. Ease of Doing Business in Tajikistan and CIS region, 2015



Note: The data refer to 2014. Source: Doing Business Database, World Bank Group, <http://www.doingbusiness.org/>.

Institutional quality

Institutional quality is one of the basic pillars of competitiveness, but also influences efficiency enhancers and innovation capacities. Institutional quality includes **government effectiveness** which is very important in countries where government structures play a key role in economic activities, either directly or indirectly, as in Tajikistan. If the extent of government regulation of business is large, its inefficiencies are detrimental to business performance, and especially to innovation performance. The size of the **informal sector** increases as it attempts to avoid regulatory pressure. The informal sector can be quite innovative indeed, but it is difficult to measure and the societal benefits are inevitably limited.

The immediate effect of government inefficiency and regulatory burden is **corruption**. The relation between corruption and a country's economic performance is in general considered as negative. However, in the case of innovation performance the research results are diverse. In countries with low quality of government institutions, or a high level of regulatory burden, corrupt practices within companies can play a positive role in greasing the wheels of

⁸¹ The density indicator, published in the World Bank Entrepreneurship Database (available for 2004-2012), is defined as the number of newly registered formal sector companies with limited liability per 1,000 working-age population aged 15-64.

innovation. The ability to corrupt a government official may in such circumstances facilitate not only the introduction of new products or services (radical innovations) by reducing the bureaucratic burden for the innovating firm, but it also eases the processes of incremental innovation. Hence, when addressing the engagement of firms in innovations, corruption is not the biggest obstacle to be tackled; rather, the key problem lies in the regulatory burden, or red tape.

Institutional quality is considered a priority issue by the public in Tajikistan. In 2014, the World Bank Group undertook the second Country Opinion Survey⁸² including the question on prioritization of development issues for the country. The respondents came from a wide range of stakeholders, representing public, government, private sector, finance, academia, expert, media, NGOs and other sectors. According to the survey results, the most important **development priorities** are: quality of public services (40%); anti-corruption (36%); followed by public sector/governance reform (28%). As to the policy agendas, the most prioritized are: job creation/employment (28%); economic growth (27%); energy sector development (23%); followed by poverty reduction (19%) and private sector development (18%). In other words, the country's institutional capacity requires substantial improvement to deliver jobs, growth, energy supply and poverty reduction.

World Governance Indicators published by World Bank provide a comprehensive overview of institutional quality and its key dimensions. The values are based on a wide range of sources, partly surveys, partly expert. Of six dimensions available, we concentrate on four of them: government effectiveness, regulatory quality, rule of law, and control of corruption. Tajikistan scores worse in all dimensions compared to the average values for the CIS region. In time, the position of Tajikistan improved slightly in corruption control, but regulatory quality worsened, in combination with stagnating and low government effectiveness and rule of law (Figure 36).

Figure 36. World Governance Indicators in Tajikistan and CIS, 2008, 2013



Source: World Governance Indicators, World Bank Group, <http://goo.gl/wjXHdi>, retrieved on 20 March 2015.

⁸² Tajikistan World Bank Country Survey 2014 Report, published in April 2015, <http://goo.gl/6XlpOJ>

In the World Bank/EBRD Enterprise Surveys on **forms of corruption** in the business sector, Tajikistan scores poorly. The survey results are quite informative as they can be interpreted as the approximation of regulatory burdens in individual government segments. The two summarizing indicators improved in time only slightly. Bribery incidence (the percentage of firms having at least one bribery experience), was at 37.9% in 2008 and 36.3% in 2013. Bribery depth (percentage of public transactions with payment or gift requested), decreased from 30.1% to 29.6% but total bribery scores are much higher in Tajikistan compared to CIS averages (23.5% on bribery incidence, and 19.2% on bribery depth).⁸³ In the case of payments to government officials to “get things done”, the improvement in time is larger in Tajikistan, decreasing from 44.6% in 2008 to 37.2 % in 2013, but again the gap compared to the CIS average persists (22.6%).

In terms of individual agendas, the highest share of bribery incidences took place in dealing with tax officials, securing government contracts and getting operating licenses. Significant improvements in time were achieved in getting construction permits, operating licenses, and electrical connections.

Financing innovative businesses

The EBRD 2014 Transition Report includes Tajikistan in the so-called “Buy group”. Firms in this group of countries predominantly **buy technology**, with the percentage of firms that engage in R&D in-house remaining relatively modest.⁸⁴ According to EBRD, better access to bank loans has a significant positive impact on technology adoption across the region, and bank financing remains the dominant source of external capital for firms. (More sophisticated instruments, such as venture capital or financing through local equity market, have not yet been developed in Tajikistan.⁸⁵)

The development stage of **financial markets** is reflected by availability and affordability of financial services, ease of access to loans, and bank soundness. These are basic requirements for accessing external finance for innovative enterprises. In the last edition of the Global Competitiveness Index, Tajikistan scored badly in the given indicators in international comparison, though some improvements did take place compared to 2010. The best score was achieved by soundness of banks (4.4 of a max. 7), followed by both availability and affordability of financial services (4.0) and ease of access to loans (3.6). However, soundness of banks was actually down on 2010. When we consider the hard data indicators, % of domestic credit to private sector to GDP (13% in 2012, 19% in 2013), the level of development of the financial sector in Tajikistan is the lowest in the CIS region (with an average share of 44.5% in 2013).

Based on World Bank/EBRD Enterprise Surveys in 2008 and 2013, the weaknesses of financial markets as the instrument of **financing businesses and innovation** in Tajikistan can

⁸³ Sectoral differences are quite large, both bribery incidence and depth were much higher in services compared to manufacturing in Tajikistan in 2013, while in 2008 the scores were opposite. So the regulatory environment worsened for services.

⁸⁴ Countries in this category include Bosnia and Herzegovina, FYR Macedonia, Hungary, Kazakhstan, Kyrgyz Republic, Moldova, Mongolia, Montenegro, Poland, Serbia, Tajikistan, Turkey and Ukraine. EBRD Transition Report 2014, Innovation in Transition, p. 17, <http://goo.gl/IUnwUl>

⁸⁵ A large equity-funding gap in the region arises as a result of underdeveloped stock markets, as well as insufficient human capital, which limit the flow of private equity funding into the region.

be identified in a more detailed way. Less than 15% of firms have a bank loan/line of credit; only 13% of firms use banks to finance investments (74% finance investment internally); and only 5% of investments are financed by banks. Some 23% of firms reported being constrained by access to finance, which is only a slight decrease compared to 25% in 2008. The constraint is much greater in the group of exporting companies (33%).

In recent years **microfinance lending** has risen rapidly, funded partly by international donors such as the EBRD, EU, WB, IFC and ADB. In EBRD Bank Survey II almost 90 per cent of surveyed banks cite participation in specialized lending programmes of the government or international agencies to support lending to micro, small or medium sized enterprises (MSMEs) as “important” or “very important” in attracting new customers. There were 120 microfinance organizations in Tajikistan at the end of 2014. In terms of microfinance institutions' gross loan portfolio (% of GDP), within Global Innovation Index, Tajikistan ranked as first globally (8% in 2014).⁸⁶

In this competitive environment, Tajikistani banks mention the inability of their loan officers to adequately assess **borrower risk** as the main constraint to lending. This situation is very different from the rest of the region where banks generally report insufficient credit demand as the most binding constraint.⁸⁷ According to the OECD report, lending to small businesses continues to be hampered by the lack of transferable land-use rights, which precludes the use of agricultural land as collateral, despite recent moves to strengthen land ownership rights.⁸⁸ The credit bureau was only established in mid-2013.

The position of Tajikistan in international comparison worsened in the 2014 Global Microscope Report, which assessed the enabling environment for **financial inclusion**.⁸⁹ The country ranking declined to 38 of 55 countries (from 30 in 2009) with the overall score decreasing from 40.4 to 38.0. (The best rank in the region was achieved by Armenia - 22). High levels of poverty and the population's general lack of trust in banks mean that the financial-inclusion environment in Tajikistan remains one of the weakest in Europe and Central Asia, according to the World Bank's **Global Financial Inclusion** (Global Findex) database, as only 2.5% of the adult population (over age 15) held an account at a formal financial institution in 2011.

According to the Global Microscope Report, major changes that have taken place in the microfinance sector in Tajikistan over the last two years include the establishment of the Credit Information Bureau in 2013, and the launch of a pilot mobile-banking project jointly by the EBRD and the National Bank of Tajikistan (NBT) in 2014. The credit bureau already boasts coverage of 90 % of borrowers, but its efficiency is yet to be proven. Since remittances play a major role in the economy, the population mostly consumes money-transfer services offered by banks and microfinance institutions (MFIs).

⁸⁶ INSEAD, Global Innovation Index, 2014, <http://www.globalinnovationindex.org>, retrieved on 15.3.2015.

⁸⁷ EBRD, Banking Environment and Performance Survey II Country Profile – Tajikistan, 2012 (Survey took place in 2010-2011), retrieved on 31.3.2015, <http://goo.gl/kYOXIP>

⁸⁸ OECD (2013), Improving Access to Finance for SMEs in Central Asia through Credit Guarantee Schemes, <http://goo.gl/jzRtvC>, retrieved on 20.3.2015.

⁸⁹ Global Microscope 2014 The enabling environment for financial inclusion. The Economist Intelligence Unit, <http://goo.gl/j1emJM>, retrieved on 22.3.2015.

The majority of Tajikistan's foreign currency and capital comes from remittances sent by Tajikistanis working abroad. The ratio of **remittances** to GDP, estimated at 50% in 2013, is the highest in the world. Although an increasing share of remittances flows through the banking system, consumers do not deposit funds into savings accounts that could be used for investment (less than 2% of remittances remain in the banking system). According to the OECD study, there are two areas of remittance-related market failures which will require specific policy action to overcome them.⁹⁰

- **Financial inclusion.** Remittances do not enter the weak financial sector. This is due to multiple challenges, including the lack of convenient and widespread ways to connect remittance transfers to saving accounts, the lack of financial literacy and any formal savings culture, and a weak financial sector that is in need of reform.
- **Migrant entrepreneurship.** Migrants interested in creating a business lack the skills and support needed to create businesses while government agencies are unable to provide the services they need. Challenges in this area include the lack of entrepreneurial skills and access to finance for returning migrants, as well as state strategies and institutions that neglect the role of migration in private sector development.

6.2 Reform efforts for innovative entrepreneurship

Support measures for entrepreneurship in Tajikistan have been undertaken on national, regional and sectoral levels, based on both framework and issue-specific normative documents, initiated and implemented by diverse actors of both horizontal and vertical natures. This support can be certainly considered as a **priority agenda** in Tajikistan and has materialized in numerous activities. This is a positive characteristic, with an emphasis being put on the involvement of a wide **range of stakeholders** in shaping the support agenda.

At the same time, however, the **analytical and evaluation capacity** is very limited, which makes the assessment of progress and identification of weaknesses and strengths difficult or even impossible, given the large number of undertaken or targeted measures and of involved stakeholders from diverse institutional sectors, and the low level of inter-sectoral trust in the society. Another problem, directly linked to the analytical and evaluation weakness of the support system, is the insufficient implementation capacity, reflected in repeatedly reformulated measures and priorities, and frequent revisions of the numerous normative documents.

Hence, despite the numerous activities and measures proclaimed, the **implementation of reforms** has been facing a number of difficulties which largely reflects the systemic weaknesses. They have been repeatedly mentioned in the annual reports of the Consultative Council for Improvement of Investment Climate (2009-2014) and in reports of international donors. Business associations were not adequately involved in the process of implementation; and one of the problems mentioned is that they do not effectively represent the interests of business community. The progress of implementation was also impeded by delays in approval of draft regulative legal acts by the ministries and agencies, which do not feel ownership of

⁹⁰OECD (2013), Improving Access to Finance for SMEs in Central Asia through Credit Guarantee Schemes, <http://goo.gl/jzRtvC>, retrieved on 20.3.2015.

the reforms (viewed as donor-driven and therefore temporary measures), and suffer from capacity constraints.

Regulatory framework

The **broader framework** for entrepreneurship support in Tajikistan is outlined in the National Development Strategy until 2015 (approved in 2007),⁹¹ and in the Strategy of increasing welfare of Tajikistan population for 2013-2015 (approved in 2012).⁹² In terms of agenda specific legislation, in 2002, the law **On state protection and support of entrepreneurship** was approved, replaced with a new edition in 2014.⁹³ The new edition reflected both international experience and the implementation of the **Programme on state support of entrepreneurship** for 2012-2020,⁹⁴ structured in three-year stages (2012-2014,⁹⁵ 2015-2017,⁹⁶ and 2018-2020, see below). Related to it is the **Concept of development of entrepreneurship until 2015** (approved in 2004, revised in 2011).⁹⁷ The Programme includes formation of a fund of support for entrepreneurship, creation of business support infrastructure, development of small and medium-sized enterprises, information and consulting support of entrepreneurship, and support of training and retraining of business skills.

In 2006, the **State Committee for Investment and State Property Management** was established (SCISPM),⁹⁸ responsible, among other agendas, for support for entrepreneurship. In 2007 (funded by EBRD), the **Consultative Council on Improvement of the Investment Climate** under the President of the Republic of Tajikistan started working (CCIIC),⁹⁹ the role of which is to support entrepreneurship, development of private sector and formation of favourable investment climate through public-private dialogue.¹⁰⁰ In 2013, the establishment of the **Fund for Support of Entrepreneurship** was approved by government.¹⁰¹ The main goal of the Fund is to provide financial support for entrepreneurs, including preferential credits at favourable interest rates.

The CCIIC is a national consultative body based on the concept of **horizontal links** between government departments and agencies and non-governmental partners (business organizations, multilateral and bilateral donor organizations and foreign investors). The

⁹¹ National Development Strategy until 2015, approved by Resolution № 704, 28 June 2007.

⁹² Strategy to increase the welfare of the population of the Republic of Tajikistan for 2013-2015, approved by Resolution № 1030, 26 December 2012.

⁹³ Law № 1107 of the Republic of Tajikistan, "On State Protection and Business Support", 26 July 2014.

⁹⁴ Programme of State Support of Entrepreneurship in Tajikistan for 2012-2020, 30 April 2012, № 201.

⁹⁵ Annex № 1, *ibid.*

⁹⁶ Resolution № 740 "On the Action Plan for Implementation of the Second Period of the Programme of State Support of Entrepreneurship in the Republic of Tajikistan for 2012-2020", 1 December 2014.

⁹⁷ Resolution № 469 "On the Concept of Development of Entrepreneurship in the Republic of Tajikistan until 2015", 3 December 2004, as amended by Decree № 380, 1 August 2011.

⁹⁸ Regulation № 590 of the State Committee of Investments and State Property Management of Tajikistan, 28 December 2006.

⁹⁹ Presidential Decree № 356, "On establishment of the Consultative Council on Improvement of Investment Climate under the President of the Republic of Tajikistan", 19 December 2007.

¹⁰⁰ Tajikistan won a prize for its innovative pro-development policies at the 8th International Workshop on Public-Private Dialogue, 10-13 March 2015 in Copenhagen, recognizing PPD platforms at the national and sub-national levels. Thus is an annual award for innovative use of PPD to tackle specific development issues.

¹⁰¹ Resolution № 34 "On establishment of the State" Entrepreneurship Support Fund", 5 February 2013, Regulation № 62 on the State Institution "National Entrepreneurship Support Fund " 14 February 2015.

permanent members of the Council are the Prime Minister and the chairman of SCISPM. The Council's main objective is to prepare agreed recommendations and proposals for the President and Government. The Council's work is organized and supported by its Secretariat.¹⁰² The meetings are organized quarterly.

On **regional and local levels**, in 2010, GIZ and IFC provided technical support to the establishment of Consultative Councils under the Governors in Sughd and Khatlon regions. During 2012-2013 GIZ extended the technical support to Gorno-Badakhshan Autonomous Region and Rasht Valley, thus covering regional public-private dialogue (PPD) platforms countrywide. The National Consultative Council Secretariat is supported by GIZ mainly to ensure that proposals, coming from the regional Consultative Councils, are considered at national level, and to improve communication and coordination, including monitoring of implementation activities, between regional and national Consultative Councils.¹⁰³

National programmes

Historically, the agenda of reform efforts in Tajikistan has been largely shaped by the results of the World Bank's benchmarking: Doing Business. In 2009, the efforts materialized in the Programme of improvement of business environment – **200 days of reforms**, with the explicit objective to enhance DB ranking through simplification of administrative procedures and introduction of one-stop-shop practices:¹⁰⁴ Entry and exit procedures, tax and customs administration, inspections and licensing, obtaining permits for construction, protection of investor rights and property rights, external trade procedures, lending, leasing and insurance procedures.

In December 2014 and February 2015, the CCIIC held **Round tables on improvement of investment climate** – an instrument to facilitate open dialogue between state and private sectors. The events presented results of reforms implemented within CCIIC activities in 2014 and plans for 2015.¹⁰⁵

For the period 2012-2014 the planned measures in the **Programme on state support of entrepreneurship** were divided into five blocks: (1) Improvement of legislation on regulation of activities of businesses, (2) Support of public-private cooperation, (3) Improvement of entrepreneurial capacities, (4) Informational support for businesses, (5) Improvement of credit-financial support of businesses. Of the total 26 measures, at the end of 2014, 18 were considered as fully accomplished and the remainder as partially accomplished. The indicators demonstrating implementation of the Programme include increasing number of business

¹⁰² *Operating Report 2008-2009* (2009). Dushanbe: Secretariat of the Consultative Council on Improvement of Investment Climate under the President of Republic of Tajikistan, page 7, <http://goo.gl/14QcH3>.

¹⁰³ FFPSD / GREAT Programme (Framework and Finance for Private Sector Development / Growth of Economy and Agriculture in Tajikistan, <http://ffpsd.tj/>), see Kosymova, Z., Abdujabborov, N., From Regional to National PPD in Tajikistan, 8th Workshop, Copenhagen, March 10-13, 2015, <http://goo.gl/SCbUP7>

¹⁰⁴ Resolution №386 "On approval of the programme " Improving the Business Environment: 200 days of Reform ", 2 July 2009, Resolution № 276 "About the Plan of Further Government Actions to Improve the Investment Climate and Indicators of the Republic of Tajikistan in International Rankings" 29 May 2010.

¹⁰⁵ News Bulletin No. 50 (2015), *Conduct of the Round Table on CCIIC - an Instrument to Facilitate Open Dialogue between the State and Private Sectors*. Dushanbe: Secretariat of the Consultative Council on Improvement of Investment Climate under the President of the Republic of Tajikistan, <http://goo.gl/4xOadT>.

entities, newly created jobs, foreign investment inflow, domestic production and exports between 2012 and 2013.¹⁰⁶ No other analysis or evaluation is available.

Important reform efforts in recent years have focused on the **tax system**. In 2012, the new edition of Tax Code was prepared, effective since 2013,¹⁰⁷ with support from the international organizations. Some key changes included the elimination of the retail sales tax, the phasing out of the road-user tax by 2017, and simplified filing and payment procedures, such as reduced filing for some taxes from monthly to quarterly. Initial estimates put the compliance cost savings of the reforms at well over \$10 million annually, mostly accrued to SMEs. However, although the new tax code simplified filing for small- and medium-sized enterprises (SMEs), administration of the code is weak and businesses complain of abusive practices by revenue agencies.¹⁰⁸ The State Tax Committee is to begin a full functional review of its operations with support from the Tax Administration Reform Project (TARP) funded by the World Bank.

The Council's **priorities in 2014** included the following: Adoption of the Government's Action Plan on the Improvement of Tajikistan's indicators in the World Bank's Doing Business survey,¹⁰⁹ adoption of the Action Plan on Improvement of the investment climate in tourism,¹¹⁰ adoption of the Action Plan on implementation of Instructions of the President of the Republic of Tajikistan from the Meeting with Entrepreneurs and Investors - and the Resolution of the Economic and Investment Forum - Entrepreneurship - the Engine of the Economy for 2014-2016;¹¹¹ the adoption of the Government Action Plan on Improvement of Investment and Business Climate in the Insurance Sector¹¹² and the draft of the law On Insurance Activity in Tajikistan (new edition). In 2015, the Action Plans on the Secondary market for securities and the Stock Exchange market are to be submitted, and the national rating of the investment climate is to be established. More attention is to be given to sector-specific programmes and reforms (tourism, agriculture, mining, construction).

Capacity and implementation constraints

Ministries have the difficult task of implementing policies in a context that does not encourage **capacity building** within their ranks. This includes the on-going brain drain of qualified personnel and experts, resulting in a limited number of civil servants possessing institutional memory of public institutions. The civil service is further characterized by a lack of incentives, low salaries and no overtime compensation. Almost 20% of ministry staff is made up of young civil servants, some of them recent university graduates. More than a third of the key policymaking institutions have staff with a length of service of just up to five years,

¹⁰⁶ Analysis of the implementation of tasks in support of entrepreneurship, http://www.gki.tj/presentation_ru.pdf.

¹⁰⁷ Tax Code of the Republic of Tajikistan at 17 September 2012, № 901.

¹⁰⁸ World Bank Group – Tajikistan Partnership Programme Snapshot, October 2014, <http://goo.gl/DPsdZk>.

¹⁰⁹ Resolution № 300 "On the Action Plan to Improve the Performance of Tajikistan in the World Bank "Doing Business" report, 3 May 2014, http://investmentcouncil.tj/upload/iblock/79f/News%20Bulletin_42.pdf.

¹¹⁰ Resolution № 301 "On the Action Plan to Improve the Investment Climate in the Tourism Sector in Tajikistan", 3 May 2014, http://investmentcouncil.tj/upload/iblock/cd9/News%20Bulletin_44_Eng.pdf.

¹¹¹ Declaration of the economic and investment forum "Dushanbe-2014: Entrepreneurship — the Engine of the Economy", 15 October, 2014, <http://goo.gl/NMlkeS>

¹¹² Appendix to Resolution № 788, "Action Plan of the Government of the Republic of Tajikistan on Improvement of the Investment Climate in the Insurance Sector", 31 December 2014.

highlighting the degree of inexperience within the newly qualified civil service in Tajikistan.¹¹³

Low levels of professionalism are a key reason for the low efficiency of the public sector in Tajikistan. One survey found that the public sector is staffed by personnel who are inadequately equipped to implement the functions of the civil service. The majority of respondents stressed that the state administration has a poor **professional education system** and public service personnel are unprepared for civil service.¹¹⁴ In 2013, the Institute of Public Administration (IPA) under the President of the Republic of Tajikistan was established¹¹⁵ to educate and train civil servants and develop methodology for their assessment. It is the only educational institution in the country authorized to train senior staff and executive specialists of the government, ministries and departments, local authorities and local self-government entities.

One of the biggest challenges of reform efforts in Tajikistan is the low quality of the legislative process and the absence of Regulatory Impact Assessment (RIA) processes. In 2009, a law On Normative Legal Acts was adopted¹¹⁶ to consolidate, regulate and put in order processes related to the development and adoption of legislation. The law was a reaction to rapidly developing laws and by-laws at all levels of bureaucracy, and aimed to streamline the regulation of legal documents. Since the adoption of the law, there have been improvements to the process of drafting legal documents. The law requires an **explicit assessment and justification** of the financial implications of proposed legislation, with further requirements specified in the 2011 Instruction of the Head of the Executive Office of the President.¹¹⁷

However, discrepancies and a lack of precision in the legislation that results in differing interpretations are still widespread.¹¹⁸ Draft legislation often lacks a thorough assessment of the funding required for implementation. Although the evaluation of the regulatory impact is a requirement in the legislative drafting process in Tajikistan, it is not practically implemented, and there are no guidelines on how it could be carried out. The introduction of RIA mechanisms, processes and elements, which are now partially described in legislation, should be systematized. Specifically, RIA provides the methodology to evaluate the impact of different proposals; identify alternative scenarios to achieve desired policy changes; ensure that the proposed legislation will positively impact those who will be affected; and determine whether the expected benefits exceed the potential costs.

¹¹³ Education, Age and Length of Service of Civil Servants in Tajikistan, State Statistics Agency under the President of the Republic of Tajikistan, 1 January 2013.

¹¹⁴ Fariza Ergasheva, Client Capacity Building under the Tajikistan GPF Grant, Survey Report, Dushanbe, World Bank Residence Mission, 2011.

¹¹⁵ Building on the former Institute for the Upgrading of Qualification of Civil Servants under the Civil Service Department of the President of the Republic of Tajikistan.

¹¹⁶ Law №506 "On Normative Legal Acts", 26 March 2009.

¹¹⁷ S. Asadov, The Policy Process in Government in Tajikistan: Recent Dynamics, Challenges and Opportunities, Bishkek, University of Central Asia, Working Paper No. 28/2014, <http://goo.gl/f9sHOR>

¹¹⁸ H. Hasanov, "Konunguzorii Dzhumkhurii Todzhikiston: Vaz'I Muosir va Durnamoi Rush," Life and Law Herald, Dushanbe: Ministry of Justice of the Republic of Tajikistan, 2 June 2012.

International programmes

The World Bank Group (in cooperation with other donors) supports the development of the private sector in Tajikistan by improving economy-wide legislation and processes and by building infrastructure and institutions for business and financial services. The aim of these projects is to accelerate implementation of regulatory reforms while supporting ongoing regulatory improvements and facilitating capacity building (both IT and human resources), and training. A unique aspect of the projects is the joint implementation of an assessment measuring the gap between how laws and regulations are written and how they are implemented, and possible ways to close these identified gaps.

Private sector competitiveness project (2012-2017) aims to improve the business environment, with a special emphasis on the mining sector and financial infrastructure, through strengthening the legal and regulatory framework and building capacity, thereby lowering transaction costs, creating efficiency, and promoting a more competitive private sector. Entrepreneurs will be able to rapidly register a new business (one-stop-shop for business registration), obtain construction permits through a transparent process (single window construction permits), and conduct other business-related operations more effectively with less cost. They will also benefit from the more efficient financial infrastructure, including its collateral registry and payment systems.¹¹⁹

Tax administration reform project (2012-2017) supports the Government's Tax Reform Programme (funded by WB IDF) at national and regional levels. The project aims to improve the quality of taxpayer services, enhance the level of voluntary compliance, reduce the size of the shadow economy, and contribute toward a more transparent, accountable and effective tax system. The project aims to improve the institutional and operational capacity of the State Tax Committee and its field offices, reduce physical interaction between tax officials and taxpayers, and operate effectively in a new automated environment. Electronic kiosks will be provided in remote locations to assist taxpayers who wish to file electronically but do not have computer access.

Business Regulation and Investment Policy Project (2013-2015)¹²⁰ includes four components, two of which relate to improving the quality of business regulation in permits and inspections, with focus on their reductions. A third component focuses on improving investment policy in the country, and the final component is a cross-cutting assessment of how to improve the quality of implementation of these reforms once adopted, which can be considered of crucial importance for the institutional capacity in the country. The pilot will include an **assessment of the implementation gap** through identifying and measuring the *de jure* and *de facto* quality of implementation of key regulations at the point of service delivery. The reforms will then be explored for businesses to report and resolve conflicts with authorities in a transparent, rule-based approach, including the tools to report on the quality of service delivery, the establishment of a private sector ombudsman, and improvements to existing dispute resolution tools within government.

World Bank Group CPS Programme 2015-2018 targets constraints that are hampering the expansion of new private investment, particularly for smaller firms and farmers. Building on

¹¹⁹ *Ibid*, page 28.

¹²⁰ IFC Projects Database, <http://goo.gl/zKx4Y4>

the previous CPS, the WBG will support implementation of reforms that reduce transaction costs on business - including by use of electronic services - and those that increase access to finance, electricity, and land. CPS support would further focus on economy-wide regulatory reforms with the objective of reducing compliance costs for the private sector throughout the business cycle—from registration to permits and licensing, tax administration, and inspections. Consequently, the average cost to comply with business regulation should decrease from the 2012 baseline of \$470 to a 2018 target of \$250. The number of entrepreneurs using electronic services to comply with business regulations, particularly tax reporting and permit applications should increase from the 2013 baseline of 2,100 to a target of 6,000 in 2018.¹²¹

The CPS will continue efforts to develop a robust **financial sector** that can attract new investment, including remittance inflows, while providing new products and services to borrowers and savers. In line with the financial sector reform strategy and action plan, the CPS will support the strengthening of financial sector regulation and supervision (both prudential and consumer protection) and improvement of the financial market infrastructure. In parallel, IFC will continue to work with individual financial institutions providing finance as well as technical assistance on risk management, foreign exchange management, and microfinance growth and transformation strategy. By working both at the regulatory and firm level, the CPS will support the development of mobile banking, which could facilitate better access to finance as well as the intermediation of remittances. Support for immovable property registration will facilitate the use of land and buildings as loan collateral.¹²² Access to finance for MSME (measured in the number of loans provided), should increase from a 2012 baseline of 54,000 to a 2018 target of 85,000.

6.3 Financial sector structure and policies

The financial sector in Tajikistan is still underdeveloped even in comparison with the neighbouring region, with some more sophisticated segments and instruments remaining at the infancy stage. The dominant part of the financial sector is represented by credit organizations with a dominant role for banks, burdened with non-performing loans, and the increasing share of microfinance institutions which are generally well governed and partly cover the financing gaps. The resources of the financial sector and therefore its capacity for investment and development activities in the business sector have been significantly constrained. Only a low proportion of the population, including labour migrants, deposit their savings in financial institutions. At the same time, access to finance is considered a major constraint to entrepreneurial activities in the country. Instruments supporting access to finance in Tajikistan are very limited both in terms of their scope (they are more diverse in the neighbouring region) and their funding resources (mostly limited to international support initiatives).

Financial sector development

The **financial sector** includes a mixture of banks, non-banking financial institutions, and financial markets. The EBRD transition sector-level indicators evaluated the gaps in financial sector reforms in Tajikistan in 2014 as “large” (indicating a major transition gap) in all of the

¹²¹ World Bank Group, Country Partnership Strategy for Tajikistan for 2015-2018, May 14, 2014, p. 32, <http://goo.gl/GCldrF>

¹²² *Ibid*, page 21.

five dimensions - both for market structure and market supporting institutions. Banking: slightly developed; Insurance, Financial services, MSME finance: less developed; Private equity, Capital markets: undeveloped.¹²³

A medium-term strategy for development of the **financial sector** in Tajikistan was approved in 2010.¹²⁴ The strategy starts with a critical overview of the current situation, based on the Financial Sector Assessment Programme of 2007 conducted by the IMF, and formulating recommendations for improvements. The problems relate to all three key dimensions, depth, breadth, and efficiency of financial sector, and their causes are identified at institutional and country levels. The **institutional** weaknesses include: insufficient skills and tools to assess credit risk, rapid increase in loan portfolios, significant lending in dollars, dis-economies of scale, and weak governance. The broader **framework** weaknesses include low public confidence in banks, limited competition, lack of liquidity management instruments, government directed lending, lack of credit information system, weak framework for property legislation, and weak accounting standards. Most of the analysed problems, however, have been persistent, as is confirmed by the subsequent assessment documents.

The conclusive statements of the 2014 Article IV Mission to Tajikistan pointed to the vulnerability of the financial sector, which requires strong actions. Non-performing loans are rising; they are concentrated in the largest banks, and are largely linked to state owned enterprises and politically-connected borrowers. Some banks are exposed to the rapidly-growing construction sector, while residential real estate prices have flattened or are even declining, signaling the need for caution. Banking supervision and regulation should be applied evenly across all banks - and without political interference - to limit forbearance and financial sector risks, and to level the playing field for dynamic and well-managed smaller financial institutions.¹²⁵

The World Bank Group Report in 2014 stressed the worsening capital adequacy ratio and profitability, as well as liquidity pressures faced by many banks due to maturity mismatches. They are increasingly dependent on the NBT for liquidity loans to meet their funding needs. Deterioration in asset quality was caused by several factors, including weaknesses in banks' risk management systems; deficiencies in the regulatory and supervisory framework and its enforcement by the NBT; and weaknesses in the financial infrastructure. Most important, however, is government interference in commercial bank decisions related to lending, branching, and mergers, and interference in the ability of the NBT to intervene in problem banks. Government actions to mitigate risks in problem banks, including the state purchase of bad loans, changes in management, and attempts to collect on non-performing loans (NPLs), have so far yielded minor results (Table 12).¹²⁶

¹²³ EBRD Transition Report 2014, Sector-level transition indicators, <http://goo.gl/z0OXPC>, retrieved on 25.3.2015

¹²⁴ Strategy for Development of the Banking Sector over 2010-2015, <http://goo.gl/4vJYdR>

¹²⁵ IMF Press Release No. 14/527, November 19, 2014, <http://goo.gl/jA9W8F>

¹²⁶ World Bank Group, Country Partnership Strategy for Tajikistan for 2015-2018, May 14, 2014, pp. 2-3, <http://goo.gl/GClDrF>

Table 12. Shares of non-performing loans in Tajikistani financial sector

	2009	2010	2011	2012	2013	2014
NPLs as % of total loans (banks)	12.7	19.2	14.0	19.2	22.8	27.2
- Microcredit organizations	3.0	4.8	6.8	6.6	2.6	3.8
NPLs net of provisions to total regulatory capital	38.5	31.2	18.4	25.4	46.2	61.2
Loan provisions to NPLs	29.4	35.9	45.7	43.5	34.8	56.7

Source: NBT, Financial Soundness Indicators, <http://goo.gl/cJ3DEt>, retrieved on 20.3.2015.

Structure and depth of financial sector

The financial sector in Tajikistan is dominated by the **banking sector** which includes three types of credit institutions: banks, non-bank credit institutions, and microfinancial organizations divided into microcredit deposit organizations, microcredit organizations, and microcredit funds. Only microcredit deposit organizations are allowed to take deposits, and not all of these actually do so, owing to limited demand for such services. Banks represent about 95 % of total financial system assets in Tajikistan; microfinance organizations about 3%, while the share of other non-bank financial institutions (NBFIs) is negligible. In addition, securities markets are virtually non-existent and enabling legislation in its infancy.

According to the Report of the National Bank of Tajikistan,¹²⁷ as of December 31, 2014, there were 138 **credit organizations** functioning in the country, including 17 banks, one non-bank credit organization, 42 microcredit deposit organizations, 42 microcredit organizations, and 36 microcredit funds. Ten banks are joint stock companies, two are state owned (Amonat Bank and AgroInvestBank), and five are branches of foreign banks: Tejorat (Iran); KazCommerceBank (Kazakhstan); First Micro Finance Bank of Tajikistan (owned jointly by the Aga Khan Fund for Economic Development and the IFC); Access Bank Tajikistan (a development bank owned jointly by the IFC, the European Bank for Reconstruction and Development, and the German Development Bank KfW); and Kont Investment Bank.

The sector is highly **concentrated**, with four large banks controlling about three quarters of total assets - of which three are linked to agriculture, construction and state-owned enterprises, respectively, with the fourth handling government payments. Tajikistani law requires newly established banks to maintain minimum charter capital of TJS 50 million and requires existing commercial banks to maintain TJS 30 million in regulatory capital. All banking institutions meet this requirement. Thirteen out of 17 banks in Tajikistan have a foreign stake in their authorized capital (making 28.5 % at the end of 2014).

According to the World Bank Report,¹²⁸ the financial sector in Tajikistan is considered **fragile and shallow**, even by regional standards. Credit to the private sector as a share of GDP jumped from 13% in 2012 to 19% in 2013, but is still extremely low. In the region of Europe and Central Asia the share made 57%. While the amount of deposits has doubled since 2009, it is very small in percentage terms of GDP (14.7 % in 2013) compared even with countries in

¹²⁷ Review of Banking System of the Republic of Tajikistan: Dynamics of development of banking system, 2015, <http://goo.gl/Zlhd4P>.

¹²⁸ World Bank Group Country Partnership Strategy For Tajikistan For The Period FY15-18, May, 2014, <http://goo.gl/vZtPLj>.

the region. The low amount of deposits is also a result of the small number of account holders. The growth in deposits in recent years might be partly explained by the Deposit Insurance Fund, which decreases the risk associated with depositing funds at a potentially unsound financial institution.

The number of **microfinance institutions** as well as the number of MFI clients has been increasing dramatically over recent years. While there were only two MFIs operating in Tajikistan in 2002, the number of active institutions has now reached 120 and the sector serves more than 220,000 customers. They are typically well governed, and are filling many gaps left by the weak banking sector. MFIs continue to have an impact in rural areas, and loans as a percentage of GDP had grown to 4.2 % at the end of 2014. NPLs only slightly increased to 3.8%. MFIs also, unlike banks, have adopted a code of conduct with respect to consumer protection. MFIs are only allowed to provide credits of up to TJS 250,000 for individuals and TJS 500,000 for legal entities. However, while still limited, the MFI share of overall credit has been growing, to 18% in 2014, up from a mere 5% in 2009.

Insurance sector in Tajikistan remains weak, and consumer confidence is extremely low. In 2013, the ratio of insurance payouts to premiums was only 11.3% compared to 80-90% in more developed economies, suggesting little benefit to policy holders in Tajikistan as well as increased risks to public safety and the inefficient allocation of resources. The Government Action Plan On improvement of investment and business climate in the insurance sector was adopted in 2014 and the draft Law On insurance in a new edition is currently being developed.¹²⁹

Leasing is underdeveloped in Tajikistan, and demand for leasing services is limited. The main problem is the low capitalisation of leasing companies which serve as middlemen between banks and lessees. The financial resources of leasing companies are limited, so the risk for banks is high. Besides the assessment of the credit risk of the lessee, the bank has to assess the leasing company as well, which is costly and time consuming. VAT that is not reimbursed and fault-finding by the tax authorities causes loss of about 15% of leasing companies' revenues annually. In addition, right of land ownership does not provide for transfer of real estate into leasing. Therefore the current legislative framework, in particular tax regulation, must be updated, taking into consideration the facilitation of opportunities for leasing operations for SMEs.

Accessibility and performance of financial sector

Limited depth of the financial sector reflects low public confidence in the banking system. Cash (M0) as a share of M2 is a measure of **liquidity preference** - it declines when the public is willing to put more of its funds into the banking system, and is thus inversely related to public confidence in the system. A lower ratio of cash to M2 indicates a higher level of confidence. **Cash outside of banks** in Tajikistan accounts for 70 % of the total money supply. In OECD countries, cash makes up about 6 % of the money supply, and in countries that borrow from the World Bank, it is about 22% on average. The high ratio of cash in Tajikistan is an indication of the low confidence that the public has in banks.

¹²⁹ Bulletin No. 50 of Secretariat of the Consultative Council on Improvement of Investment Climate under the President of the Republic of Tajikistan, 2015, <http://goo.gl/UDzaZ9>

The narrow use of the financial sector also reflects limited public confidence in the local currency. Around 65 % of total deposits, and 80 % of individual deposits, are held in foreign currency (almost exclusively US dollars). Because of the high dollarization of deposits, banks lend largely in dollars, even if the borrowers do not earn dollars. This shifts the foreign exchange risk to the borrowers, thus increasing the banks' credit risk. High dollarization remains a source of vulnerability.

The number and structure of bank accounts indicate that access to the financial sector is low. The limited utilization of the banking system is evident from the low number of **individual accounts**; equivalent to only about 2.5% of the population. **Deposits of individuals** make up only 38% of total deposits, with the rest belonging to legal entities. The use of the financial system for transactional purposes is particularly low, with **demand deposits** comprising only 27% of total deposits and only 3% of individual deposits. Lack of accounts with formal financial institutions contributes to low formal **savings rates**, dependence on informal credit sources and a lack of credit for large purchases.

The share of small and medium sized enterprises (SMEs) with a bank account and with a loan from a financial institution in Tajikistan varied significantly across different types of enterprises. Just 7% of individual entrepreneurs surveyed had an account and 20% had a loan, while the equivalent shares for owners of private, commercial "Dekhan"¹³⁰ farms were 22% and 16%, respectively. Meanwhile, 86% of small and medium companies in Tajikistan had a bank account and 31% had access to a loan.¹³¹

The private sector has access to several different credit instruments, but **interest rates** in Tajikistan are high. Interest rate spread (lending rate minus deposit rate, in %) is very high and increased from 13.4% in 2012 to 17.8% in 2013. In the region of developing countries in Europe and Central Asia the spread reached (on average) 8.5% in 2013. Commercial banks in Tajikistan offer loans with annual interest rates averaging 25% in 2014¹³² (29.5% for individuals, 20.2% for legal entities). The main reason cited by SMEs for not applying for loans from financial institutions is high interest rates. SMEs are also constrained due to the usually very short **maturity of credit** – most loans are due after a period of six months to one year. In addition, many enterprises state that the amount of credit they obtain does not fulfil their credit needs.¹³³

Due to a lack of deposits, especially long-term deposits, financial institutions face maturity mismatches and therefore **liquidity pressures** as the maturity of deposits is often shorter than credit maturity. The vast majority of deposits at financial institutions in Tajikistan are sight deposits that can be withdrawn at any time, as opposed to time deposits that have to be held for a minimum period. The limited amount of overall deposits, as well as the short maturity of existing deposits, limits the financial sector's ability to provide credit, in particular long-term credits.

¹³⁰ Dekhans were established after 1997 as a result of reform of the Soviet-era state and collective farms, see for example: USAID Country Profile for Tajikistan: Property Rights and Resource Governance.

¹³¹ IFC SME Tajikistan Survey, 2009, Enterprise Survey World Bank/EBRD, 2013.

¹³² National Bank of Tajikistan, Statistical Bulletin 2014, p. 10, <http://goo.gl/jK1fs1>, retrieved on 31.3.2015

¹³³ OECD, Enhancing access to finance for SME development in Tajikistan, January 2015, <http://goo.gl/qJXqy2>

Overall, the liquid sight deposits account for 83% of all deposits in Tajikistan, and the share is even higher for deposits in local currency, at 93%. The share of liquid assets to total assets has been deteriorating from 29% in 2012 to 21.5% in 2014, the share of liquid assets to total assets from 57.8% to 43.4%.

Profitability of the financial sector in Tajikistan worsened in 2014. Return on assets decreased from 0.2 to -4.4 in 2014, return on equity from 0.7 to -29.2. Moreover, the misclassification of some loans and under-provision for NPLs suggests that capital, return on assets, and return on equity are overstated.¹³⁴ The aggregate numbers also disguise high stress in some individual banks. Interest income to gross income decreased from 29.2% to 21.4% in 2014, on the other hand, non-interest expenditure increased from 77.2% to 93.4%.¹³⁵

Constraints to access to finance

In 2014, the OECD provided an extensive assessment of progress in developing a legal and regulatory framework conducive to SME lending, the availability of sources of external finance other than bank lending, as well as other tools that affect demand and supply of finance in Tajikistan.¹³⁶

Framework conditions stimulating access to finance for SMEs include adequate **credit information** systems, such as cadastre systems for land registry, business and collateral registries, credit bureaux, and accounting standards, and rules ensuring **enforcement** of creditor and property rights and bankruptcy laws.

Cadastre legal acts and institutions managing the land registry have been created in Tajikistan, but information is not provided in a systematic manner and the state registry only provides a basic level of information. Land is owned by the state, and land-use rights are not accepted by banks as collateral. The process for accessing ownership information is complicated and the State Land Cadastre System lacks qualified personnel. As a result, banks do not rely on cadastre information as a basis for defining and securing the value of loan collateral. Allowing the population to have title deeds for their property would enhance their asset base, and support decreasing high collateral requirements. Secure ownership could also create incentives for investment and the allocation of land to productive producers.

Very high **collateral and provisioning requirements** constrain the ability of SMEs to access credit. The national bank has defined high levels of collateral requirements, between 130% and 250% of the loan amount, to avoid systemic risk in the banking system. The exact level varies depending on the customer's credit history, the specifics of the loan and the type of financial institution involved. However, transparent information on the exact requirements is not available and the process of determining the collateral value is complex and lengthy. More extensive information to SMEs and banks about regulation and registration procedures should be provided and red tape cut to address systemic risk in the banking sector.

Legislation for **registration systems for movable assets** was adopted and a movable property registry created, but stopped working in 2011. Local financial organisations thus do not

¹³⁴ World Bank Group Country Partnership Strategy For Tajikistan For The Period FY15-18, May, 2014, <http://goo.gl/vZtPLj>

¹³⁵ NBT, Financial Soundness Indicators, <http://goo.gl/cJ3DEt>, retrieved on 20.3.2015.

¹³⁶ OECD, Enhancing access to finance for SME development in Tajikistan, January 2015, <http://goo.gl/qJXqy2>

consider movable assets as a security. Time-consuming registration procedures, a lack of centralisation and limited ability to edit register entries created further barriers for SMEs to make use of the registry. The registration procedures for movable assets should be simplified, the movable property registry made operational again, and registration expanded to regional and district centres. Information should be disseminated among banks, MFIs and SMEs about using the registry as an effective tool during financial operations.

Credit information services are limited. In 2012, a credit bureau was established in co-operation with the National Bank of Tajikistan through an IFC project, and started operation in 2013. It distributes both positive and negative credit information and guarantees the borrower's right to inspect their data. According to official information, the credit bureau has contracts with 70 financial organisations and about eight million credit histories in its portfolio. Current issues include the lack of information, as a large user base has yet to be built; untimely updates of credit histories; and the lack of long-term preservation and provision of information. Development of a credit information bureau market, increasing the number of bureaux and creating an accessible database of borrowers should be supported.

Laws and procedures on distressed companies, receivership and bankruptcy are formally confirmed by local government entities responsible for banking and financial activity, as well as by contracts between the participants of any credit activity. At the same time there are a large number of sublaw acts which sometimes contradict existing regulation. Therefore a strict guidance on the application of local acts should be provided with the reduction in numbers of sub-law acts and increased transparency; and the strengthening of creditor rights, rules of law and market-based approaches in the banking system.

In Tajikistan, only a very limited number of policies and instruments to improve **access to external sources of finance** are in place and functioning. This is partly a reflection of the general lack of capital in the country. One positive exception is the supportive business environment microfinance institutions (MFIs) encounter in Tajikistan. However, MFIs can only partly address the credit demand of SMEs as they are limited in the amount of credit they can lend to businesses.

A small **credit guarantee scheme** has been established in Tajikistan with the help of the donor community. However, the scheme remains limited in both funding and staffing. Partly as a result of its current limited scope, there is little awareness of the scheme. The scheme in place should be strengthened and increased and a more extensive guarantee scheme set up with a broader coverage and scope.¹³⁷

The government of Tajikistan, in co-operation with the donor community, has established several funds to support SMEs through **subsidised credit lines**. The Fund for SME Development provides direct credits at preferential terms to SMEs and is administered by the State Committee for Investments. Similarly, the Tajikistan Rural Finance Programme, financed by the German government-owned development bank KfW and administered by the Ministry of Economic Development and Trade (MEDT), provides credits worth EUR4.5 million. Credits are dispersed through MFIs with the aim of stimulating rural development. MFIs can decrease their interest rate and thus increase their profit margin by increasing the

¹³⁷ OECD, Improving Access to Finance for SMEs in Central Asia through Credit Guarantee Schemes, 2013, <http://goo.gl/76FwjG>

share of lending for agriculture or agricultural equipment (KFW, 2013). While these steps are very important, the funds distributed through these programmes are far from enough to meet the demand for credit in Tajikistan.

6.4 Recommendations

The Government rightly considers support measures for entrepreneurship as a priority agenda item in Tajikistan. As key enabling factors of innovative entrepreneurship, aside from the quality of the business environment and the institutional quality which directly and indirectly affects this environment, we consider specific 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 into the curricula at the various educational levels;*
- *Running public awareness-raising campaigns on the importance of entrepreneurship for socio-economic development; and*
- *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 to 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 SMEs 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, reducing the interest rate 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 the OECD, other international organizations and domestic stakeholders by:

- *Increasing the range of assets that are legally acceptable as collateral; and clarifying collateral and provisioning requirements;*

- *Reforming land ownership¹³⁸ 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; and*
- *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 lacking credit histories and assets that could be pledged as collateral, additional policy support may be needed to secure project 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); and*
- *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 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 State 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; and*

¹³⁸ Strictly, rather than “land ownership”, it is more accurate to refer to the granting of the right to use land to a person for life, along with right of inheritance. One possibility is to develop and institutionalize “pledge of right”, which although established under the Civil Code (arts. 326 and 364), Land Code (art. 27(1)) and Law on Mortgages (chapter 9) of Tajikistan, lacks the necessary institutional mechanism. This means banks do not in practice lend money based on right of land use as collateral.

- *Targeting an economy-wide coverage of the scheme, with local outposts catering to local needs, and 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, which therefore remain vulnerable to year-to-year, or even month-to-month fluctuations in remittances received. The recent significant decline in remittances has very clearly exposed this vulnerability. At the same time, Tajikistanis working abroad may have the opportunity to save some of their income, and to acquire some useful business skills, experience and networks of potentially value to the domestic economy, provided these workers can be persuaded to invest in it.

Recommendation 6.5

In order to encourage Tajikistanis 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 the 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;*
- *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; and*
- *Introducing privileges for micro-credit applicants who attract matching funding originating from remittances.*

Chapter 7

THE ROLE OF INNOVATION IN INTERNATIONAL ECONOMIC INTEGRATION

This chapter reviews the international dimension of innovation. While this issue will also be covered in other chapters of the Review to some extent, the aim of this chapter is to bring together various international aspects and assess these from the point of view of their contribution to the international economic integration of Tajikistan. The chapter discusses various international cooperation initiatives in areas related to innovation and assesses how the existing institutional and legal frameworks support the effectiveness of these initiatives, both in relation to Western countries and integration processes in the CIS. In particular, it considers the interaction between international organizations with relevance to innovation activity and innovation policy. The analysis serves as the basis to draw policy conclusions and recommendations.

7.1 Internationalization of the economy and innovation

Foreign Direct Investment

Traditionally, Tajikistan's main trade partners have been countries with geopolitical interests in the region, such as Russia, Kazakhstan, Uzbekistan, Azerbaijan, China and Ukraine. The strong presence of many of these countries in Tajikistan reflects apparent reasons such as geographically proximate locations, similar legal systems, a shared history and a shared use of the Russian language.

Not surprisingly, primary investors to implement investments in the Tajikistan are Russia, China, Kazakhstan, USA, the Philippines and Iran (Table 13). Inward FDI flows recorded¹³⁹ an upward trend during much of the period from 2005 to 2013. There is some uncertainty about the size of annual FDI inflows. The Agency of Statistics¹⁴⁰ under the President of the Republic of Tajikistan recently reported Tajikistan's annual FDI at \$341.1 million in 2013. According to UNCTAD, Tajikistan's annual FDI was \$108 million in 2013.¹⁴¹ Based on the latter figure, the country ranked 139th in the world for FDI as a percentage of GDP with its FDI inflows making up just 1.3% of GDP in 2013.¹⁴²

¹³⁹ <http://unctadstat.unctad.org/CountryProfile/762/en762GeneralProfile.html>

¹⁴⁰ <http://www.stat.tj/ru/macroeconomic-indicators>

¹⁴¹ http://unctad.org/en/PublicationsLibrary/wir2014_en.pdf

¹⁴² <http://data.worldbank.org>

Table 13. Sources of FDI in Tajikistan, 2007-2014

Country	FDI \$ million	Distribution across sectors
Russia	1,319.7	Construction, telecommunication, geological exploration, financial services, healthcare, industry, construction, trade, energy, tourism and other services
China	1,036.5	Telecommunication, construction, financial services, geological prospecting and surveying, installation of technical equipment, industry, construction and other services
Kazakhstan	522.7	Financial services, geological exploration and research, industry, trade
United States	409.7	Telecommunications, financial services, education, agriculture, health, infrastructure rehabilitation and bank protection works, construction, geological exploration and research, industry
Philippines	291.4	Agriculture, road construction, maintenance, installation of technical equipment, financial services, government, health care, education
Iran	262.3	Industry, construction, financial services, trade
Cyprus	185.1	Construction, tourism, trade
Azerbaijan	177.9	Financial services
Luxembourg	175.5	Financial services
Germany	159.8	Financial services, installation of technical equipment

Source: The State Committee¹⁴³ on Investment and State Property Management of the Republic of Tajikistan; Agency of Statistics under the President of the Republic of Tajikistan

According to the Agency of Statistics¹⁴⁴ under the President of the Republic of Tajikistan, from 2007 to 2014 inclusive, foreign investments (cumulatively) reached a total of \$5,685.9 million (Table 14): with foreign direct investment (FDI) at \$2,405.6 million, other types of investment at \$3,277.8 million, as well as \$1.8 million in portfolio investments.

Table 14. Sectoral distribution of FDI in Tajikistan, 2007-2014

Sectors	\$ million
Energy sector	596.8
Mining industry	534.5
Telecommunications	349.1
Financial services	315.2
Construction	313.0
Other industry	137.5
Trade	35.9
Food industry	10.9
Agriculture	11.7
Construction of roads	11.3

¹⁴³ http://www.gki.tj/ru/nvestitsii_v_rt/nformatsiya_i_statistika

¹⁴⁴ http://www.gki.tj/ru/nvestitsii_v_rt/nformatsiya_i_statistika

Table 14. Sectoral distribution of FDI in Tajikistan, 2007-2014 (continued)

Sectors	\$ million
Other construction related	8.0
Health sector	5.0
Transport	2.5
Tourism	0.2
Air transport	0.3
Education	0.7
Other sectors	73.2

Source: The State Committee on Investment and State Property Management of the Republic of Tajikistan; Agency of Statistics under the President of the Republic of Tajikistan

While Tajikistan generally attracts FDI at a slow rate, China is set to invest over \$6 billion in Tajikistan over the next three years. The overall amount is equal to two-thirds of Tajikistan's GDP in 2013 and is about 40 times greater than its annual foreign direct investment.¹⁴⁵

Tajikistan's President has made many public and private statements calling for increased foreign investment, particularly in energy and transport infrastructure. The government of the Republic of Tajikistan seems to be paying special attention to the development of a favourable investment climate in Tajikistan.¹⁴⁶

As Tajikistan starting to feel the impact of the latest economic slowdown in Russia, its government has become more active in its attempts to attract foreign investors. Accordingly, Tajikistan invited foreign and local investors, top government representatives and international financial institutions to take part in the first ever *Tajikistan Economic and Investment Forum*¹⁴⁷ to promote the country as an investment destination and inform the global financial community about recent steps taken by the government toward a better investment climate (Box 3). The event took place in Dushanbe in October 2014 and was co-hosted by the State Investment Committee of Tajikistan, the European Bank for Reconstruction and Development (EBRD) and the Brussels-based Euroconvention Global. Forum participants included investors from a significant number of countries including China, India, Russia and Singapore, as well as some Western nations.

¹⁴⁵ <http://on.ft.com/10IXI38>

¹⁴⁶ http://planipolis.iiep.unesco.org/upload/Tajikistan/Tajikistan_ED_Sector_Plan_2012-2020.pdf

¹⁴⁷ <http://www.ebrd.com/news/2014/ebd-cohosts-first-ever-tajikistan-foreign-investment-conference.html>

Box 3. The first Tajikistan Economic and Investment Forum

During the first ever Tajikistan Economic and Investment Forum in October 2014, the Financial Times (FT) and the EBRD and in partnership with GIZ, the German development agency, KfW, the German development bank and the International Finance Corporation (a member of the World Bank Group) co-organized a side event titled “FT-EBRD Leadership Briefing” in a format that enabled an open and frank exchange of ideas. One subject brought up by many speakers was the need for Tajikistan to promote itself in the world and promote its potential in order to attract more investment interest. The EBRD’s Head of Office in Dushanbe, Richard Jones, said: *“The fact that the Government has launched an investment conference on this level is a testament to how Tajikistan is opening up to the world. In a country which has traditionally relied on remittances and donors, there’s now talk about accessing global capital markets. Businesses have benefited from recent reforms, including simpler taxes and less red tape. By co-hosting the Government-led forum and launching the informal event with the Financial Times, the EBRD aims to support better private-public dialogue and ultimately to bring more private investment into Tajikistan.”* The event’s moderator, FT correspondent for Moscow and Central Asia, Jack Farthy, said: *“Tajikistan is the definition of a frontier market for foreign investors. But it was clear from the large number of attendees at this forum that there is genuine interest in the country. The Financial Times will be closely following developments in Tajikistan and reporting on whether this interest translates into deals.”*

Source: <http://www.ebrd.com>

As the country is now increasingly competing for foreign investment with other developing countries, the Tajikistani government should continue reviewing some of these regulatory and policy measures that could facilitate further Foreign Direct Investment (FDI). Additional measures could target poor infrastructure and a lack of skilled workers. They would also need to focus on simplifying bureaucratic requirements and procedures, offering additional incentives, and decreasing tax rates. Foreign firms would consider investing in Tajikistan only if its government could ensure adequate conditions that would provide them with a fair chance to compete in the country.

Various laws of the Republic of Tajikistan provide guarantees and incentives for investors such as various legislative guarantees for enterprise and the system of tax and customs privileges and preferences (Table 15). Yet, some suggest¹⁴⁸ that in reality the authorities in Tajikistan tend to be particularly interested in state-led investment and external loans from the country’s perceived geopolitical friends rather than making conditions favourable for private investors from abroad. Non-transparent practices and barriers to competition generally result in excessive costs, uncertainty and additional risks. Ralph De Haas, EBRD Acting Director of Research,¹⁴⁹ pointed out that while many investors believe Tajikistan has a significant potential in many areas including hydropower, mining, agriculture, and transit, further steps must be taken by the Tajikistani government to improve the business climate which could help realize this potential.

¹⁴⁸ <http://www.state.gov/documents/organization/228816.pdf>

¹⁴⁹ <http://www.ebrd.com/news/2014/ebrd-cohosts-first-ever-tajikistan-foreign-investment-conference.html>

Table 15. Current tax and customs privileges and preferences

Measure	Application	Description	Legal basis
1. Exemption from customs duty (customs duty rate of 5% to 15%) and value added tax (tax rate 18%).	All enterprises	Importing manufacturing equipment and essential operating components thereof for formation or increase of authorized capital of the company or modernization of existing production, provided property is used directly for the production of goods, works and services in accordance with the basic documents of the enterprise and is not classified as excisable goods, as well as personal property imported by foreign employees of enterprises with investment directly for their own needs.	Customs Code of the Republic of Tajikistan (Article 345.4) Tax Code of the Republic of Tajikistan (Article 211.4, part 4) Resolution of the Government of Tajikistan No.50 as of 23.10.03.
2. Exemption from value added tax (18%) and customs duties (5% to 15%)	All enterprises	Customs duties not levied when importing goods intended for implementation of target projects approved by Government of Tajikistan on the expenses (within) of grants and (or) credits (lending) provided by legal or natural persons, foreign states, governments of foreign states or by international organizations.	Tax Code (Article 211.4, sub-item 6) Customs Code (Article 345. 6)
3. Exemption from value added tax (18%) and customs duties (5% to 15%)	All enterprises	Supply of goods, works and services as humanitarian aid.	Tax Code (Article 211.2 sub-item 7). Customs Code (Article 345.3)
4. Operations taxed at a zero rate	All enterprises	Exports of goods, other than raw cotton, cotton fibre and primary aluminium, subject to value-added tax at the zero rate.	Tax Code (Article 214.1)
5. Exemption from income tax (15%). In addition to the income tax a permanent establishment of a foreign legal entity is taxed on the net profit of the permanent establishment at the rate of 8%)	All enterprises	New manufacturing enterprises, during year of state registration and the year following their initial state registration, when founders make investments of following amounts to authorized enterprise capital, taking account of minimum investment amounts established by the legislation, for period of: - 2 years for amounts up to \$500,000; - 3 years, for amounts \$0.5-\$2 million - 4 years, for amounts \$2-\$5 million; - 5 years, for amounts above \$5 million.	Tax Code (Article 145. 6)
6. Exemption from value added tax (18%), tax road users (2%), tax on corporate income (15%), minimum corporate income tax (1%), land tax (ranges from TJS180 to 500 per ha. land), tax on vehicle owners (from 2 to 11%), real estate tax, social security tax (25%) for persons directly employed in construction of hydro power plants and not citizens of Tajikistan.	Building owners and general contractors for construction	During construction hydro power plants on the territory of the Republic of Tajikistan	Tax Code (Article 343.1)

Table 15. Current tax and customs privileges and preferences (continued)

Measure	Application	Description	Legal basis
7. Exemption from value added tax (18%) and customs duties (from 5% to 15%)	All enterprises	Import of goods for the construction of hydro power plants, which constitute highly important facilities of Tajikistan	Tax Code (Article 343. 2)
8. Exemption from value added tax (18%) and tax on road users (2%), social tax (25%)	Construction suppliers and subcontractors, persons directly involved in construction of hydro power plants	Natural persons and legal entities directly involved in construction of hydro power plants, persons who are not citizens of Tajikistan	Tax Code (Article 343.3)
9. Exemption from customs duty (from 5% to 15%) and value added tax (18%)	All enterprises	Imports of goods for personal use of newly created enterprises with full cycle of cotton processing into final products (from cotton yarn to cotton garments)	Tax Code (Article 344.1)
10. Exemption from value added tax (18%)	All enterprises	Exports of goods produced by newly created enterprises with complete cycle of cotton processing into final products (from cotton yarn to cotton garments)	Tax Code (Article 344. 2)
11. Exemption from income tax of legal entities (15%), minimum corporate income tax (1%), real estate tax and land tax (ranges from TJS180 to 500 per ha. land)	All enterprises	Newly created enterprises with a complete cycle of cotton processing into final products (from cotton yarn to cotton garments) exempted from these taxes.	Tax Code (Article 344. 3)

Source: <http://mfa.tj/en/investment-climate/investment-climate-in-tajikistan.html>

7.2 Internationalization of research, science and education

Globalization challenges the economy of Tajikistan, and as a result, its industry and the economy as well as various social structures - including education - will need to be upgraded. The participation of science and research actors in international and cross-border networked innovation systems can lead to innovation and competitiveness in many emerging economies. By encouraging the participation of business and research institutions in global knowledge flows, policymakers could improve their country's ability to attract foreign direct investment and skilled labour. Further policy measures are often required, starting from the opening of globally competitive educational institutions and improvements in curricula and educational programmes delivered in foreign languages through all stages of education¹⁵⁰.

The education system of Tajikistan is supported by loans and grants from the World Bank, Asian Development Bank, Islamic Bank, UNICEF, UNDP, USAID, GTZ, GIZ, Saudi Arabia

¹⁵⁰ Knowledge, innovation and internationalisation. Science and Technology Policy Council of Finland. Helsinki 2003. ISBN 951-53-2484-X. http://www.minedu.fi/export/sites/default/OPM/Tiede/tutkimus-ja_innovaationeuvosto/julkaisut/liitteet/Review_2003.pdf

Development Fund, German Development Bank, Catalytic Fund, Aga Khan Fund, Open Society Institute of the Soros Foundation, Save the Children Fund, American Councils for International Education, Operation Mercy, Red Cross, World Food Programme, Mercy Corps and other international organizations.

The role of language skills

Knowledge of other languages is considered by businesses to be an increasingly critical skill when trading with other countries. International experience suggests that a lack of staff with appropriate language skills could present a significant challenge to carrying out these activities. In fact, it can lead to difficulties finding business partners, seeking funding abroad and accessing new international markets. A large share of the overall population in Tajikistan is already bilingual with a combination of Tajik, Russian and Uzbek, and in urban areas increasingly trilingual. However, there are various estimates as to how many people in Tajikistan are able to converse through a foreign language. According to one estimate¹⁵¹ made in 2010, the proportion of the population speaking a foreign language other than Russian (English, French, German, Turkish etc.) stood at some 1.5–2%. Perhaps around 5% of the population of Tajikistan has at least some English language skills today.

The importance of foreign languages for capacity building (and trade capacity building, more specifically), is generally well recognized by the government of Tajikistan. The President has proposed that every citizen of the country should know both English and Russian in addition to their mother tongue. The most recently approved¹⁵² government programme, ‘Improving teaching and learning of Russian and English in Tajikistan in 2015-2020’, aims to achieve results in the following areas:

- Expansion of international relations with educational institutions in Russia and other countries;
- Training of teachers in Russian and English languages at universities in foreign countries, creation of new training opportunities in areas of educational institutions of the Shanghai Cooperation Organisation (SCO) countries;
- The international exchange of students and teachers of Russian and English, particularly within the educational system of the SCO countries;
- Joint scientific, methodological, pedagogical and sociological research in the field of foreign education, cognitive linguistics, linguistics, and methodology of teaching Russian and English languages;
- Organization of symposiums, conferences and other events on improving teaching and learning Russian and English languages under modern conditions;
- Improving cooperation with international organizations, research institutes, Russian and European universities, scientific and cultural centres, other major foreign organizations in the fields of science, education and arts.

The education system in Tajikistan traditionally includes compulsory Russian classes starting from primary school. It has been reported¹⁵³ that approximately 25% of Tajikistan’s population speak fluent Russian, 60% speak intermediate-level Russian, and 15% have a

¹⁵¹ Central Asia Regional Data Review, Vol. 2, No. 1, Spring 2010.

¹⁵² Approved by Government Resolution n 427 of the Republic of Tajikistan on July 3, 2014.

¹⁵³ Central Asia Regional Data Review, Vol. 2, No. 1, Spring 2010.

weak or no command of the language. However, the more recent figures show that the share of school pupils educated through a language other than Tajik has decreased over the past five years (Table 16). There are significant changes in the tertiary education over the period 2009 to 2013. An ever-growing number of all in Tajikistan are currently educated through either Tajik (80.7%) or Russian (18.5%). The number of students receiving tertiary education primarily through Uzbek has decreased over the same period from 2.2% of all students to just 0.3%. While there is a fivefold increase in the number educated in English (0.5%), the actual student number is fairly low at 771 individuals (in 2013) to fulfil the growing needs of Tajikistani businesses.

Table 16. Shares of students educated through various languages

Languages	School education			Tertiary education		
	2009	2013	Change	2009	2013	Change
Tajik	76.8%	81.2%	+4.4%	79.7%	80.7%	1.0%
Russian	16.6%	15.1%	-1.5%	17.9%	18.5%	0.6%
Uzbek	5.6%	3.6%	-2.0%	2.2%	0.3%	-1.9%
Kyrgyz	1.1%	0.2%	-0.9%	-	-	-
English	-	-	-	0.1%	0.5%	0.4%

Cross-border mobility of students, researchers and scientists

A growing number of emerging economies seem to approach capacity-building objectives through active efforts to internationalize their domestic higher education. Successful internationalization efforts often depend on the development of links to export networks, industry clusters and research consortia, as well as a continuous investment in creating a skilled and mobile workforce. Such investment, coupled with efforts to simplify cross-border trade and create opportunities for foreign investors, can enable the exchange of knowledge and contribute to creating a competitive environment conducive to innovation.

The Tajikistani education system does not appear to be well aligned with the needs of a changing labour market at home or abroad. In its Global Competitiveness Report (GCI) 2014–2015,¹⁵⁴ the World Bank places Tajikistan 88th in the world overall in relation to the indicator “*Quality of scientific research institutions*” and 90th on indicator “*Availability of scientists and engineers*”. Similar to many developing countries, Tajikistan faces the problem of having to develop its domestic tertiary education system as well as its research infrastructure. Tajikistani universities and research institutes have a particular task in contributing to their country’s knowledge and S&T human capital and to put it at the disposal of its civil society. This is why Tajikistan’s efforts in anticipating educational needs must be urgently developed.

Currently 159,400 students attend 34 higher education institutions in Tajikistan. While the overall population in the country has increased from 2000 to 2013 by a massive 23.6%, the actual number (headcounts¹⁵⁵) of researchers over the same period remained relatively unchanged at 1,565 in 2013.¹⁵⁶ According to the Ministry of Economic Development and

¹⁵⁴ World Economic Forum. <http://www3.weforum.org/docs/GCR2014-15/Tajikistan.pdf>

¹⁵⁵ Headcounts are data on the total number of persons who are mainly or partially employed in R&D. This includes staff employed both “full-time” and “part-time”.

¹⁵⁶ <http://www.uis.unesco.org/das/Country/Science?code=TJK®ioncode=40505&SPSLanguage=EN>

Trade, as of January 2010 a total of 5,196 researchers work in various research organizations in Tajikistan¹⁵⁷. UNESCO estimated the number of full-time researchers¹⁵⁸ in the country at approximately 200 researchers per million of inhabitants in 2012. Most of these researchers are employed by public universities, higher education institutions and research institutes.

Tajikistani researchers are still trying to catch up with the trend in the international academic community in which performance is often measured based on research outputs such as publications. Furthermore, internationally co-authored publications are frequently used to evaluate the degree of international cooperation in research. Based on the figures from one source¹⁵⁹, Tajikistani researchers produced about 114 publications in 2013, resulting in just 33 citations. As a result, Tajikistan is placed 148th globally, well below Armenia, Azerbaijan, Uzbekistan and Moldova (Table 17).

Table 17. Scientific output, 2013

Global Rank	Country	Documents	Citable documents	Citations	Self-Citations	Citations per Document	H index
2	China	425,677	416,292	127,012	76,245	0.3	436
15	Russia	43,930	42,512	13,057	5,519	0.3	355
43	Pakistan	10,915	10,493	3,718	1,343	0.34	130
45	Ukraine	9,004	8,720	2,583	873	0.29	159
72	Kazakhstan	1,607	1,574	339	156	0.21	59
73	Belarus	1,584	1,494	1,042	145	0.66	114
75	Latvia	1,393	1,355	495	91	0.36	94
86	Armenia	980	927	994	136	1.01	116
88	Georgia	894	797	921	95	1.03	90
93	Azerbaijan	708	688	396	46	0.56	50
100	Uzbekistan	505	479	139	55	0.28	58
110	Moldova	386	377	154	44	0.4	68
111	Mongolia	381	363	136	31	0.36	61
135	Kyrgyzstan	147	133	78	16	0.53	35
148	Tajikistan	114	112	33	4	0.29	24
157	Afghanistan	73	64	21	1	0.29	24
193	Turkmenistan	17	16	4	0	0.24	17

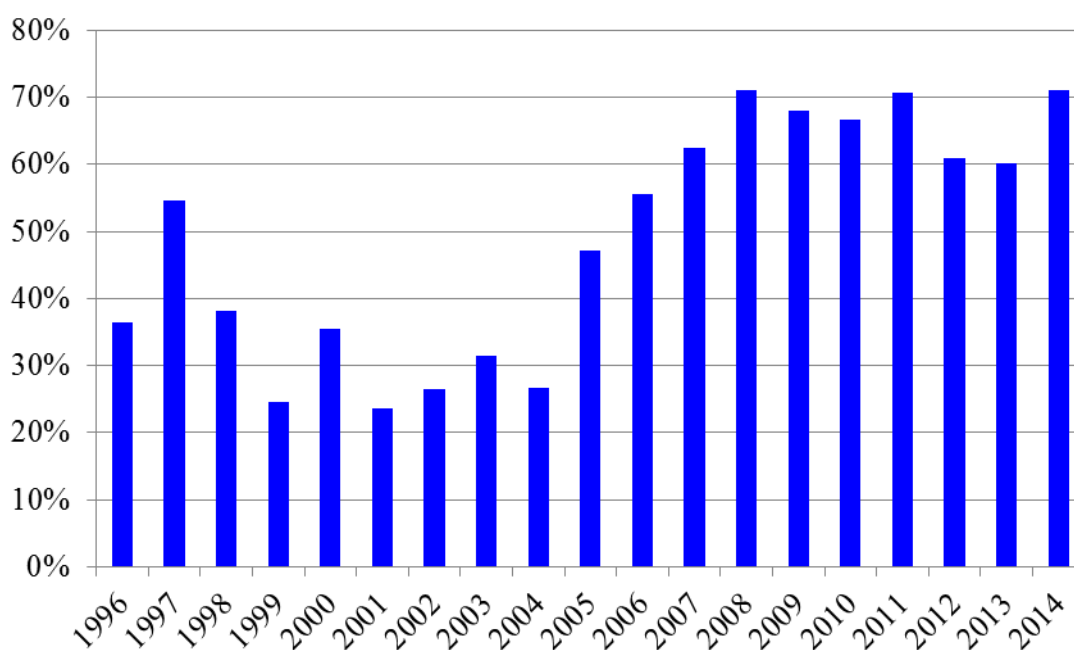
Source: Scimago Lab. Data Source: Scopus.

Due to a long-standing relationship with academic institutions across the ex-Soviet Union, most academics and researchers in Tajikistan continue to rely on the Russian language as their main scientific idiom. Unsatisfactory language skills lead to the less than adequate participation of Tajikistani scientists in key international conferences and a low rate of scientific publications co-authored with researchers from other countries. While the share of scientific publications by Tajikistani researchers involving foreign colleagues has been increasing since 2003, this figure has recently begun to decrease (Figure 37).

¹⁵⁷ Tajikistan's Science and Technology Strategy, 2011-2015. <http://info.maorif.tj/?q=ru/node/268>

¹⁵⁸ Source: <http://www.uis.unesco.org/DataCentre/Pages/country-profile.aspx?code=TJK®ioncode=40505>

¹⁵⁹ SCImago Journal & Country Rank. Retrieved April 11, 2015, from <http://www.scimagojr.com>

Figure 37. Publications with international collaboration, per cent, 1996-2014

Source: Retrieved from Scimago Lab <http://www.scimagojr.com/>. Data Source: Scopus.

Note: Data show share of documents involving more than one country.

There are also positive examples of the active participation of Tajikistani researchers in international programmes such as the ISTC Mobility Programme. A number of Tajikistani researchers have participated in this Programme, which provided them with additional opportunities for cooperation with scientists and researchers from other CIS countries, Canada, European Union Member States, Japan, Republic of Korea, Norway and the United States. In 2013, over \$1.2 million had been allocated to four projects in Tajikistan and a total of \$12.5 million was spent on 44 research projects in the country from 1994 to 2013.

An inadequate level of international mobility is not a problem limited just to researchers and academic staff. To improve its education system, the government must also tackle its tertiary education. To achieve this, it has decided to work towards joining the Bologna Declaration¹⁶⁰ that could in the long run help Tajikistani universities become more competitive and attractive to the rest of the world. By proactively taking part in the Bologna process, Tajikistan could facilitate access of its citizens to European education, improve quality and increase student and teaching staff mobility by introducing an internationally-compatible system of grading and academic credits in higher education, thereby enabling the recognition of Tajikistani educational programmes and curricula abroad. This increased compatibility with various education systems in Europe would make it easier for students and job seekers to use their qualifications from one country to apply for a job or course in another. Importantly, many European countries - including two of Tajikistan's key partners, Russia and Kazakhstan - are already members of this Europe-wide initiative.

¹⁶⁰ www.ehea.info

In order to join the European Higher Education Area (EHEA), Tajikistan would also need to introduce significant reforms of its education system, leading to the recognition of foreign qualifications, three-tier systems and associated guidelines. According to a recent World Bank report, while the Tajikistani government began introducing some of these changes¹⁶¹ in 2007, several major parts of this reform have still to be undertaken. Promoting high quality mobility of students (as well as that of early stage researchers, teachers and other staff in higher education), has been stressed as an important objective of the Bologna Process¹⁶². High quality mobility is also an important pillar for exchange and collaboration with other parts of the world. Further, it has additionally been suggested that by 2020 at least 20% of those graduating in the EHEA should have had a study or training period abroad.

Academic mobility of researchers and students could facilitate capacity-building efforts in Tajikistan. Increased outward student mobility can lead to many significant benefits such as improved language skills, increased access to modern research facilities and involvement in international academic networks. Similar to the Bolashak programme administered by the government of Kazakhstan, Durakhshandagon¹⁶³ (the Tajikistani President's international Scholarship Programme) was initiated¹⁶⁴ in 2009 to address some of these issues. Under this programme, a number of Tajikistani candidates are provided with stipends to pursue studies abroad. The actual number of candidates sent abroad under this programme in 2011 stood at about 12 per year, with most going to academic institutions in Russia, Belarus and Kazakhstan¹⁶⁵. Yet in 2014, a group of 71 Tajikistani students was sent to study abroad under this scholarship. Five of these recipients went to Poland, one to Hungary, and two persons per country to the United States, Macedonia and Turkey. The annual cost of training one student abroad for a degree under this programme is estimated to range from \$5,000 in Russia to \$30,000 in Western countries. The Durakhshandagon programme can prove important in igniting government efforts to improve study/research quality in Tajikistan. As the scholarship programme is now in its sixth year, it is increasingly important to carry out a regular comprehensive evaluation so that its focus could be changed if deemed necessary.

As of 2011, the Ministry of Education of Tajikistan has signed¹⁶⁶ over 100 documents on cooperation in the field of education with education ministries of foreign countries and international organizations. According to Amrohon Aliyev¹⁶⁷ (Head of International Relations of the Ministry of Education and Science of Tajikistan), partner countries have collectively budgeted for a total of 1,200 university places for training Tajikistani nationals in 2012. Out of this allocation, 700 places were offered in Russia¹⁶⁸. In 2013, Tajikistan sent a total of 2,400 people to study abroad, out of which 1,700 people went to universities in Russia. In

¹⁶¹ Kataoka, Sachiko; Karakhanyan, Susanna; Imaizumi, Saori; Kodirov, Shodibeg; Atoev, Asomiddin; Bazarova, Saodat; Amoroso, Jeremie Matthew; Chukmaitova, Dariga. 2014. *Tajikistan - Higher education sector study*. Washington, DC; World Bank Group.

¹⁶² Mobility strategy 2020 for the European Higher Education Area (EHEA). EHEA Ministerial Conference, Bucharest, 2012.

¹⁶³ <http://edu-cip.tj>

¹⁶⁴ Resolution of the Government of the Republic of Tajikistan n 208, from April 2, 2009.

¹⁶⁵ <http://news.tj/ru/news/12-tadzhikskikh-studentov-budut-obuchatsya-za-rubezhom-po-prezidentskoi-stipendii-durakhshandag>

¹⁶⁶ *ibid*

¹⁶⁷ <http://www.avesta.tj/sociaty/24851-amrohon-aliev-k-sozhaleniyu-mnogie-vypuskniki-hotyat-poluchit-professii-v-kotoryh-ne-nuzhdaetsya-tadzhikistan.html>

¹⁶⁸ This number also includes university places allocated by the Russian government for Russian nationals living in Tajikistan.

2014, the Ministry of Education and Science of the Russian Federation allocated a further 782 places, including 350 in its academic and educational establishments for Tajikistani students wishing to continue studies for bachelor, master and PhD level degrees. According to the Ministry of Education,¹⁶⁹ a total of 3,685 Tajikistani students enrolled during the current academic year (2014-2015) on an educational course abroad, with their tuition fees being covered by Tajikistan or host country governments. The number of students whose degrees are financed by either Tajikistan or foreign governments has increased fivefold since 2010 (Table 18). In 2014, the Russian government allocated 782 university/college places, a further 277 places were allocated by China, 250 by Iran, 100 by Kazakhstan, 50 by Kyrgyzstan, 20 by Ukraine, 108 by Belarus, 10 by Turkmenistan, and 40 were offered at Malaysian universities.

Table 18. Number of Tajikistani (funded) students abroad, 2010-2014

Year	2010	2011	2012	2013	2014
Students	618	1,211	1,269	2,354	3,685

In addition to the outward mobility of Tajikistani students, a number of foreign students come annually to Tajikistan to continue their education. At present, about 1,000 foreign students are studying at various universities and colleges across the country. The government of Tajikistan covers the education costs of about 300 such foreign students each year. Most tend to come from neighbouring Kyrgyzstan, Kazakhstan, Iran and Afghanistan (about 50 students per country per year).

7.3 Legal and institutional framework for international cooperation

According to Tajikistan's Constitution (Article 12), the state 'guarantees freedom of economic and entrepreneurial activities, equality and legal assistance of all forms of ownership, including private'. In line with the Law¹⁷⁰ 'On Investments', the government guarantees the equality of domestic and foreign investor rights. The Law also establishes a fair and equitable legal framework to safeguard these rights and provides a legal framework to deal with the implementation of various investment activities. The government of Tajikistan stresses that the purpose of this law is the 'attraction and effective use of material and financial resources, advanced equipment and technology, managerial expertise in the economy of the Republic of Tajikistan; providing favourable conditions for investment activities, as well as conditions for free use, transparency, ownership and disposal of investments; compliance with international rules of law and international practice of investment cooperation'.

In recent years, the Academy of Sciences of the Republic of Tajikistan has signed documents relating to cooperation on a bilateral and multilateral basis with various academic institutions, research and production centres, as well as the Academies of Sciences of Russia, Belarus, Ukraine, Azerbaijan, Kazakhstan, China, India, Afghanistan and other countries. Having signed to date a total of ten international agreements, the Academy of Sciences is now also a

¹⁶⁹ <http://news.tj/ru/news/ucება-za-granitsei-bez-konkurentsii>

¹⁷⁰ Law of the Republic of Tajikistan 'On investments' dated May 12, 2007, n 260

signatory to five intergovernmental agreements and a member of five international organizations, commissions and committees. Over 200 Tajikistani researchers and scientists have carried out joint research with scientists from foreign research organizations. The Academy of Sciences is now a full member of the International Association of Academies of Sciences, the Association of Academies of Sciences in Asia, the Academy of Sciences for the Developing World and the International Council for Science.

Box 4. Developing international S&T cooperation

In many respects, the scientific future of Tajikistan will depend on how fast it can build the necessary infrastructure to take its rightful place in world science. The government has effectively recognized this fact in the strategy for S&T adopted for 2007–2015. In this strategy, science appears as a national priority and is described as being vital for progress and a better quality of life.

The strategy outlines an ambitious programme for developing scientific co-operation with other countries, including fellow members of the CIS, as well as international organizations via intergovernmental agreements and partnerships to be concluded by the Academy of Sciences, research institutes and universities.

There are good prospects for expanding multilateral scientific co-operation via such bodies as the International Association of Academies of Sciences, the Association of Academies of Sciences of Central Asian Countries, The Academy of Sciences for the Developing World and the standing Committee on Scientific and Technological Cooperation of the Organization of the Islamic Conference.

Source: UNESCO Science Report 2010

The Academy of Sciences of the Republic of Tajikistan has identified¹⁷¹ four main areas for international cooperation:

- Creation of new joint research centres; exchange of scientific and technical information; as well as a shared use of scientific equipment such as the International Research Centre, “Pamir-Chacaltaya”.
- Implementation of joint programmes and projects, the design of mechanisms to deepen cooperation with the scientific and industrial centres of the CIS countries, India, China, EU member States, and the United States.
- Expansion of scientific and technical cooperation with the countries of East Asia (in particular, China, India and Japan) for the organization of mutually beneficial programmes and projects in promising areas, the participation of scientists of the Academy of Sciences of the Republic of Tajikistan in educational courses and programmes of professional training.
- The participation of scientists from the Academy of Sciences of Tajikistan in scientific events, conferences, symposiums and seminars held abroad, as well as the organization of various scientific forums in Tajikistan with the participation of colleagues from other countries.

¹⁷¹ *Ibid*

7.4 International cooperation agreements

In addition to various agreements at state level, the country is also a signatory to a number of bilateral collaborations concluded by its Academy of Sciences. The Academy of Sciences maintains a significant number of international connections with scientific centres in foreign countries. Not surprisingly, Tajikistan is mostly active in various research projects and programmes involving researchers from Russia, Uzbekistan, Belarus and Kazakhstan. Tajikistani researchers are less active in projects that involve participants from other countries, including the European Union. Tajikistan's bilateral research collaboration is more oriented towards the region of Central Asia and its neighbouring countries, such as Afghanistan, China, Iran, Pakistan and India but also the USA rather than towards Europe¹⁷².

About 60 such agreements are currently listed on the website¹⁷³ of the Academy of Sciences. These have been signed at national, regional and institutional level with counterparts from 21 countries between 1993 and 2013. Not surprisingly, over 60% of all listed agreements have been signed with eight ex-Soviet republics. Over one third have been signed with Russian counterparts, about 15% with various Chinese counterparts, and just 7% with European Union countries (Germany, Czech Republic, Slovakia and Estonia).

Russian Federation

Russia is one of Tajikistan's oldest partners. The two countries have signed over 230 interstate, intergovernmental and interdepartmental agreements regulating cooperation in political, economic, military, cultural, humanitarian and other areas.¹⁷⁴ Tajikistan and Russia share common positions on many international and regional policy and integration questions, with additional importance attached to questions of effective cooperation within such international and regional organizations as the UN, OSCE, CIS, SCO, EAEU and CSTO. During state visits, the key issues of Tajik-Russian cooperation discussed are linked to the military and border sphere, security in the region, expansion of trade and economic relations, and labour migration. A number of agreements on the implementation of bilateral large-scale economic projects in hydropower and non-ferrous metallurgy, mining gas, oil and minerals in Tajikistan were also signed.

According to the Russian Federal Migration Service, over 1.15 million Tajikistani nationals were registered with the Russian authorities as of October 2014. Nearly 85% of these people are men (975,000). This is equal to roughly 15% of the overall Tajikistani population of 8.16 million people, as reported by the Tajikistan's Statistics Office at the end of 2014.¹⁷⁵ To protect the interests and rights of its citizens in Russia, the government opened a Consulate General in two major Russian cities: Yekaterinburg and Ufa.

The Russian authorities expressed¹⁷⁶ support for the implementation of the CASA-1000 project, as well as Tajikistan's efforts to use its hydropower capacity to promote regional development. Another large investment project focused on the hydroelectric power station,

¹⁷² http://www.inco-ca.net/_media/incoNet_WhitePaper_ANNEX_revised_1June2012.pdf

¹⁷³ <http://www.anrt.tj/index.php/ru/ob-akademii/nauchnoe-sotrudnichestvo/mezhdunarodnoe-sotrudnichestvo>

¹⁷⁴ <http://mfa.tj/en/relations-with-cis-countries/relations-tajikistan-russia.html>

¹⁷⁵ <http://www.stat.tj/en/macroeconomic-indicators/>

¹⁷⁶ <http://mfa.tj/en/relations-with-cis-countries/relations-tajikistan-russia.html>

"Sangtuda-1", was put into operation in 2008. A key role in the development and strengthening of economic and scientific-technical cooperation belongs to the Tajik-Russian Intergovernmental Commission on Trade and Economic Cooperation. Russia is the main trading partner of the Republic of Tajikistan, with a share in the trade balance of the country reaching more than 20%.

Over the years, Russia has remained a major investment partner of Tajikistan with a total accumulated investment of about \$1.2 billion. The volume of direct Russian investments in the republic's economy in 2013 was \$80.9 million (in 2012 it was \$106.2 million), representing a decrease of 23.8%. Over the past few years, Russia has invested over than \$700 million in Tajikistan. "Gazprom Neft", a leading Russian company, has invested over \$40 million in Tajikistan and currently supplies approximately 60% all petrochemicals consumed.

In 2008, the two governments agreed that a number of leading Russian universities would establish branches in Tajikistan. The Russian-Tajik Slavonic University is a binational university, established as a branch of the University of Slavic Russia in Tajikistan. Finally, Moscow State University has opened a division in Dushanbe City in 2010. Over the past five years, the number of Tajikistani students in Russian universities has reached over 5,000 and continues to increase.

The main sectors of bilateral investment cooperation between Russia and Tajikistan are currently energy, design and development of oil and gas fields, development of modern petrol stations and telecommunication services. At present, Russia does not take part in any significant infrastructure projects in the territory of the Republic of Tajikistan, as virtually most of these are carried out in the framework of CAREC and the funds allocated by the Asian Development Bank¹⁷⁷. It has been suggested that since Russia is not a party to the ADB, earlier attempts by Russian companies to participate in tenders for the right to implement these projects did not work out.

People's Republic of China

Tajikistan's political and economic relations with China have risen in recent years to a new level, and a number of strategic Sino-Tajikistani projects are now being implemented in the country. Today, China is a strategic partner of the Republic of Tajikistan and the largest investor there. The legal framework of the two countries accounts for over 200 intergovernmental agreements. In 2011, China and Tajikistan signed an important agreement resolving a very old border dispute, with Tajikistan relinquishing just 400 square miles of territory to China. Both Tajikistan and China are active members of regional and international organizations and closely cooperate within the framework of these, particularly the Shanghai Cooperation Organization. Between the Republic of Tajikistan and the People's Republic operates the Tajik-Chinese Intergovernmental Commission on Trade and Economic Cooperation. The Chinese government firmly supports Tajikistan's efforts to preserve national security and stability and also assists Tajikistan in its economic development.

¹⁷⁷ http://www.ved.gov.ru/exportcountries/tj/tj_ru_relations/tj_rus_projects/

China is an increasingly important trade partner. It is estimated that the bilateral trade turnover between the two countries approached the level of \$2 billion in 2013. The main commodities exported from China to Tajikistan are electrical engineering equipment and technologies, machinery, textiles, technology, communication products and furniture. Tajikistani exports to China are aluminum and aluminum goods, cotton, hides and skins, silk, etcetera. China is also becoming the largest source of direct investment into Tajikistan - at \$92.9 million. China has suggested it will invest about \$6 billion in Tajikistan over the next three years. The amount is equal to two-thirds of Tajikistan's GDP in 2013 and about 40 times greater than Tajikistan's annual foreign direct investment¹⁷⁸. There are currently over 70 Chinese enterprises in Tajikistan operating in the area of reconstruction and construction of roads, tunnels, bridges and power plants, laying power lines, and the creation of enterprises for the production of cement and other building materials. An important joint venture, Tajik-Chinese gold mining company, "Zarafshon", invested over \$60 million in Tajikistan in 2013.

With financial and technical support from China, Tajikistan implemented several strategic projects including the construction of the national Dushanbe-Chanak highway; Shahrstan, Shar and Chormagzak tunnels; and "South-North" and "Lolazor- Khatlon" power transmission lines.

Every year, the Chinese government, on the basis of a number of bilateral agreements in the field of education, allocates quotas for Tajikistan students to attend universities in China. Over 2,000 Tajikistani students currently study in 112 Chinese universities and colleges.

Afghanistan

The presidents of Afghanistan and Tajikistan meet regularly to discuss a wide range of issues of mutual concern. Over 70 agreements have been signed to date to provide a solid basis for developing cooperation between neighbouring countries. To further promote relations, both countries collaborate in various formats: regional - trilateral (Tajikistan-Afghanistan-Iran) and quadrilateral (Tajikistan-Afghanistan-Pakistan-Russia) to enhance cooperation in different areas, as well as regional and international issues and promote mutual understanding.

Both countries have shown an interest in improving their current economic relationship. As of now, about 85 private Afghan companies operate in Tajikistan. In addition to trade, Afghanistan seeks to import energy. The countries have also agreed to set up a joint commission with Iran to explore the possibilities of transferring 500 KW of energy from Tajikistan to Afghanistan and Iran. Other proposed infrastructure projects include the construction of a highway across Tajikistan, Afghanistan and Iran; and a railway stretching from Tajikistan to Afghanistan and Iran. In addition, 750km of high-voltage electricity transmission lines are expected to connect Tajikistan with Afghanistan and Pakistan.

In order to facilitate trade between the two countries, the US funded \$37 million for the construction of a highway bridge across the Panj River that opened in 2007. Effectively, the bridge has now replaced a barge with a very limited cargo capacity and which could only be used during a limited number of months. It is often argued that the bridge has increased the flow of Tajikistani goods into Afghanistan and enhanced commercial opportunities on both

¹⁷⁸ <http://on.ft.com/10IXI38>

sides of the river. Trade turnover between the two countries by September 2013 averaged \$120 million (exports \$74 million and imports \$46 million). Tajikistan was also Afghanistan's fourth largest export market in 2013¹⁷⁹.

Tajikistan and Afghanistan continue to cooperate closely in the area of education and culture. In 2013, Tajikistan funded 50 scholarships for Afghan citizens.

Iran

The Islamic Republic of Iran was the first country to open its Embassy in Dushanbe. Since then, a total of over 100 agreements on cooperation have been signed between neighboring nations that share a common language.

The volume of bilateral trade between the two countries continues to increase. In the first eight months of 2013, it reached \$280 million. There are also around 200 Iranian companies currently registered in Tajikistan, including a tractor manufacturer, "TajIran". A number of significant infrastructure projects are supported with the help of Iranian investment, including the construction of a hydropower station ("*Sangtuda-2*" with a 220 MW capacity) that opened in February 2006.

The Ministry of Science, Research and Technology of the Islamic Republic of Iran has allocated 250 places for training Tajikistani nationals at several of its educational institutions. Tajikistan reciprocated by offering 30 places at Tajikistani higher education institutions for Iranian students in 2013.

Germany

The Federal Republic of Germany established diplomatic relations with the Republic of Tajikistan in December 1992 and the diplomatic representation of Germany was one of the first foreign missions in Tajikistan, commencing its activity in Dushanbe on June 10, 1993. Since then, Germany has signed more agreements with Tajikistan than other European Union countries (44 agreements). From the first day of cooperation between both countries, the German government implemented more than €170 million in the framework of technical and financial cooperation. As of 2012, Germany, Austria and France were the only three EU Member States to sign bilateral S&T agreements with Tajikistan¹⁸⁰. Besides multiple agreements at intergovernment level, Tajikistan has attempted to establish additional forms of collaboration with German counterparts at university or Academy of Science level. The Academy of Sciences maintains the widest international connections with scientific centres in foreign countries.

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)¹⁸¹ has been supporting economic and social development and reconstruction in Tajikistan since 1995. A number of programme offices support GIZ's work in rural parts of the country. Most of its work is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The organization also carries out work on behalf of a number of German public and

¹⁷⁹ http://trade.ec.europa.eu/doclib/docs/2006/september/tradoc_114134.pdf

¹⁸⁰ http://www.inco-ca.net/media/incoNet_WhitePaper_ANNEX_revised_1June2012.pdf

¹⁸¹ <http://www.giz.de/en/worldwide/382.html>

private bodies, which can include foreign governments, the European Commission, and other international organizations. Over 17 projects and programmes are currently underway in Tajikistan, four of which are bilateral, while 13 are regional and global initiatives. Its priority areas are linked to health and sustainable economic development¹⁸². According to the Tajikistan's State Agency on Statistics, over the first nine months of 2013, the trade turnover between the two countries reached \$26.1 million, out of which exports were \$0.54 million and imports \$25.6 million.

Over the years, the German government has also provided significant support cooperating with Tajikistan in the sphere of culture and education. As a part of its assistance, it allocated €5 million in 2005 for improvements to elementary education in Tajikistan. The German side actively promotes various forms of academic exchange. Annually, under the programme more than ten students from Tajikistan take part in various training activities in Germany.

United States of America

The United States and Tajikistan have been building a broad-based relationship, cooperating in such areas as counter-narcotics, counterterrorism, non-proliferation, and regional growth and stability. Since establishing a bi-national relationship, about 30 documents¹⁸³ have been signed relating to trade and economy, the fields of military-technical cooperation, combating terrorism and illegal drugs trafficking.

Tajikistan has signed a trade and investment framework agreement with the United States and other Central Asian countries, establishing a regional forum to discuss ways to improve investment climates and expand trade within Central Asia. In 2010, the countries launched an annual bilateral consultation process to enhance cooperation. The United States recognizes¹⁸⁴ Tajikistan as a strong partner in its efforts to bring security and peace to Afghanistan, playing an important role in supply and transit routes. The US assistance portfolio is somewhat focused as it is designed¹⁸⁵ to advance Tajikistan's capacity to deter regional threats such as extremism, radicalization, terrorism, and drug trafficking, while increasing its regional trade connections; improving counter narcotics efforts; strengthening border security and enhancing the capacities of its law enforcement agencies; strengthening local government and improving health services; reforming the education system; and increasing food security.

The US has also financed a number of key infrastructure projects such as the highway bridge across the Panj River which opened in 2007 (\$37 million). The US government provides in-service teacher training to improve primary-school literacy, develop reading materials, promote government support of reading improvement, and foster out-of-school reading time. It also provides assistance to enable talented and deserving students from Tajikistan to attend the American University of Central Asia.

USAID is another important development partner in Tajikistan (Box 5). The US government's Feed the Future initiative addresses food insecurity by improving agricultural production and profitability as well as improving nutrition outcomes for mothers and

¹⁸² http://www.duschanbe.diplo.de/contentblob/3239666/Daten/3525977/GIZ_Portfolio_10_2013_ENG.pdf

¹⁸³ <http://mfa.tj/en/relations-with-euroepian-and-amerikan/tajikistan-united-states-of-america.html>

¹⁸⁴ <http://www.state.gov/r/pa/ei/bgn/5775.htm>

¹⁸⁵ <http://www.state.gov/documents/organization/231117.pdf>

children.¹⁸⁶ According to USAID, its personnel also work on strengthening civil society and local governance and facilitating implementation of various education and health strategies. In the energy sector, USAID works towards achieving economic integration among the Central Asian countries and between Central and South Asia by helping to create an economically competitive regional energy market that will increase access to, and stabilize the cost of, energy for the people of Tajikistan.

Box 5. USAID activities in Tajikistan

Since 2010, USAID has established and registered 56 water user associations, providing nearly 100,000 farmers with irrigation water to improve food security. It has advanced local governance reform by supporting an Inter-Ministerial Working Group that passed legislation enabling four pilot municipalities to control their own budgets for the first time ever. A USAID-funded network of legal aid centres has helped more than 27,000 farmers learn about and assert their land use rights since 2010. More than 60% of Tajikistan's 3,000 non-governmental organizations received USAID assistance with their legal re-registration efforts in compliance with changing legislation, and USAID's civic education project is bringing together leaders across Central Asia to learn from each other and better meet the needs of their constituents. With 50% of Tajikistan's fourth graders unable to read at grade level, USAID education programmes work to bolster the reading culture for pre-primary and primary school students. Efforts focus on improved reading instruction, increased availability of appropriate reading materials, greater after-school reading time and renewed government support for literacy.

Other activities target older students, especially girls, who are most at risk of dropping out of school. USAID also supports cross-border vocational education through courses in English, information technology, accounting and construction for participants from Tajikistan and Afghanistan to foster cooperation and improve employability in both countries.

Source: <http://dushanbe.usembassy.gov/usaaid.html>

The European Union

The EU is also an important partner in Tajikistan's economic development, with assistance projects at regional and national level. However, while a small number of joint ventures are active in the country, the overall volume of Foreign Direct Investment (FDI) from the EU remains rather limited. Trade and economic relations between the EU and Tajikistan are governed by the Partnership and Co-operation Agreement signed in 2004 and which came into force on 1 January 2010. This agreement¹⁸⁷ provides for a non-preferential accord under which the two parties treat each other as a "Most-Favoured Nation" (MFN) in respect to tariffs. The agreement also envisages a progressive regulatory approximation of the national legislation and practices of most important EU trade-related standards, including technical regulations, sanitary and phytosanitary requirements, protection of intellectual property rights, and customs issues. This should lead to better practical access to EU markets for goods

¹⁸⁶ <http://www.usaid.gov/tajikistan/our-work>

¹⁸⁷ http://www.eas.europa.eu/delegations/tajikistan/eu_tajikistan/trade_relation/index_en.htm

originating in Tajikistan. Tajikistan is also a beneficiary¹⁸⁸ of the EU's Generalized System of Preferences (GSP), a bilateral trade arrangement through which the EU provides preferential access to its market to developing countries and territories, in the form of reduced tariffs for their goods when entering the EU market. Preferential imports from Tajikistan are heavily concentrated in one sector only (textiles) but also include industrial products.

EU-Tajikistan trade relations are limited but have been growing in recent years. In 2008, the EU was Tajikistan's third important trade partner, with a 10.3% share in its total external trade¹⁸⁹. The main EU imports were aluminum, agricultural products, textiles and clothing. The key EU exports were machinery, transport equipment, agricultural products and chemical products.

The European Commission's cooperation with Tajikistan and other countries in Central Asia is based on a multi-annual regional cooperation strategy, which takes into account the situation and needs of each country (Box 6). The overall EU co-operation objectives, policy responses and priority fields for Central Asia can be found in the EC Regional Strategy Paper for Central Asia 2007-2013 which foresees an investment of €719 million for regional programmes and country-based projects, and the Central Asia Indicative Programme 2007-2010.

Box 6. Legal framework for EU-Tajikistan bilateral relations

The legal framework¹⁹⁰ for EU-Tajikistan bilateral relations is the Partnership and Co-operation Agreement between the European Union and Tajikistan. It was signed in October 2004 and came into force on 1 January 2010. Pending its ratification, an Interim Agreement on trade and trade-related matters had been implemented in May 2005. The Partnership and Co-operation Agreement with Tajikistan is the most recent agreement negotiated with a CIS partner and brings EU relations with Tajikistan in line with relations with the other Central Asian countries.

Its objectives are to provide a framework for political dialogue; to provide a basis for legislative, economic, social, financial, civil, scientific, industrial, technological and cultural cooperation; to promote trade and investment, in particular in the energy and water sectors, and sustainable economic development; and to support Tajikistan's efforts to consolidate its democracy, develop its economy and social infrastructure, and achieve transition to a market economy.

The Development Cooperation Instrument, which replaced the successful and well-known TACIS in 2007, is among the instruments the EU uses to support Tajikistan's economic transition to a market economy. EU assistance (Box 7) focuses in particular on support for democratic development and good governance, regulatory reform and administrative capacity-building, infrastructure development and energy efficiency. More than 165 projects are currently being carried out across a wide-range of sectors, regions and cities in Tajikistan.

¹⁸⁸ *ibid*

¹⁸⁹ *ibid*

¹⁹⁰ http://www.eeas.europa.eu/delegations/tajikistan/eu_tajikistan/political_relations/legal_framework

EU funding for projects in Tajikistan is provided in the form of grants, contracts and, increasingly, budget support.

Box 7. EU-funded projects in Tajikistan (as at 2012)

The EU contributed to the institutionalization and operationalization of the Public Financial Management (PFM) reform strategy through the PFM Project (€1.85 million; 17/12/2009 – 04/06/2014). The project was managed by the World Bank and supported by the EU, UK Department for International Development, government of Japan and with significant co-financing from the government of Tajikistan. It focused on enhancing the Ministry's capacities in more effective budget planning and execution, capacity-building and the introduction of a Government Financial Management Information System. The project Strengthening Public Internal and Financial Control (€860,100; 8/12/2010 – 8/12/2013) supported the establishment and strengthening of internal control systems and professionalization of the internal audit function.

Two additional PFM projects were completed by 2012:

- The Support to the Public Administration Reform Strategy (€643,500; 20/12/2010–19/12/2012) contributed to the public administration reform implementation;
- Technical Assistance to the Ministry of Finance regarding the Sector Policy Support Programme (€503,127; 10/12/2010–10/12/2012) which contributed to: (i) the improvement and monitoring of the quality of social protection and health services/benefits and (ii) the effective implementation of the PFM Reform Action Plan Subsequent Sector Policy Support programmes.

Finally, the project supported establishment of the Tajik Financial Academy (€1 million, 15/12/2011-15/12/2013) that provided training to all Tajikistani public finance staff.

Source: http://ec.europa.eu/europeaid/documents/aap/2012/af_aap_2012_tjk.pdf

Tajikistan received its main share of bilateral assistance (€66 million for 2007-2010) in support of sector programmes, technical assistance and grants. Cooperation focused on social protection, health and private sector development, all underpinned by public finance management. The country also received regional and thematic assistance in areas like border management and drug control (BOMCA/CADAP), education (TEMPUS, Erasmus Mundus), water/environment, human rights and democracy (EIDHR), non-State actors and SME development (CA-Invest), and disaster preparedness (DIP-ECHO). The European Commission also provided Tajikistan with ad hoc support (such as in the aftermath of the energy crisis in 2008), and with the Global Food facility to support its social safety nets and agricultural development. The total value of EC assistance allocated to projects in Tajikistan since 1992, adding up all the instruments, is over €500 million.

During the Cooperation Council, co-organized with the Republic of Tajikistan and held in 2014, the European Commission announced new development funding of €251 million to Tajikistan for the period 2014 to 2020. These funds will focus on a number of predefined sectors for growth and social stability, such as rural development, health, and education. The Cooperation Council re-confirmed the commitment of both parties to strengthen relations in a number of cooperation areas and emphasized the importance for Tajikistan to further integrate

into the global economy, including the necessity to improve its business and investment climate and take forward economic reforms.

The Cooperation Council discussed regional and international issues, underlining the importance of regional cooperation in Central Asia and with neighbouring Afghanistan. The EU confirmed its appreciation of Tajikistan's role in regional cooperation, notably in the areas of border management, customs, trade facilitation and counter narcotics. In addition, the Cooperation Council called on Central Asian partners to search for a sustainable settlement regarding energy, water management and environment issues in the region. The EU will thus focus its support to Tajikistan in the next seven years on rural development (€110 million), health (€62.2 million) as well as education and vocational training (€75 million).

FP7 and Horizon 2020

The European Union (EU) is strongly committed to strengthening its relations in all areas of cooperation with all Central Asian countries including Tajikistan. This effort is implemented through *"The EU-Central Asia: Strategy for a New Partnership"*. The document adopted by the European Council in 2007 aims to reinforce EU-Central Asian relations in all areas, especially reinforcing cooperation in human rights, education, rule of law, energy and transport, environment and water, common threats and trade and economic relations.

In addition, the EU is interested in increasing cooperation in the field of science and research with its Central Asian partners because the two regions share numerous scientific challenges.¹⁹¹ Investments and cooperation focus on innovation and particularly on innovative agriculture and sustainable energy. Stronger cooperation can be achieved in all scientific areas through the participation of organizations from Central Asian countries in the Seventh Framework Programme (FP7). The Tajikistan National Information Point (NIP) for EU Framework Programmes was established in 2004. It is a non-governmental institution named Society for Development of Scientific Cooperation (SODESCO).

Tajikistan was not involved in the Comenius, Erasmus, Leonardo da Vinci or Grundtvig programmes. The Tempus Programme was opened to Tajikistan in 2004. Five Tajikistani universities became involved: Technological University of Tajikistan, Tajik State University of Commerce, Tajik Pedagogical University, Technical University of Tajikistan and the Tajik Agrarian University. Tajikistani nationals take part in Erasmus Mundus, with 132 students, researchers and academic staff received¹⁹² scholarships to study in the EU over 2007-2011.

Three Tajikistan research organizations participated in FP7 projects and a total of six such applications were submitted. The total EC contribution to these projects amounts to €136,500. In comparison to the FP6, Tajikistani participation in the FP has decreased¹⁹³ (five Tajikistan research organizations participated in FP6 projects). In addition, as of April 2015, Cordis lists¹⁹⁴ 26 records of various Tajikistani institutions that took part in various EU-funded projects (Table 19).

¹⁹¹ <http://ec.europa.eu/research/iscp/index.cfm?lg=en&pg=eeca>

¹⁹² http://eeas.europa.eu/delegations/tajikistan/more_info/erasmus_mundus_programme/index_ru.htm

¹⁹³ http://www.inco-ca.net/media/incoNet_WhitePaper_ANNEX_revised_1June2012.pdf

¹⁹⁴ CORDIS is the European Commission's primary public repository and portal to disseminate information on all EU-funded research projects and their results in the broadest sense. <http://cordis.europa.eu>

Table 19. EU-funded research proposals and projects

Title	Category	Tajikistani Participants	EU contribution	Period
ICT transfer concept for adaptation, dissemination and local exploitation of European research results in Central Asian countries	FP7-ICT	Technological University of Tajikistan	n/a	01/03/2013 to 31/08/2015
STI International Cooperation Network for Central Asian Countries	FP7-INCO	Academy of Sciences	€56,311	11/09/2013 to 10/09/2016
Framework to integrate Space-based and in-situ sensing for dynamic vulnerability and recovery monitoring	FP7-SPACE	Institute of Geology, Earthquake Engineering and Seismology	€18,000	01/01/2013 to 31/12/2014
International Cooperation Network for Central Asian and South Caucasus Countries	FP7-INCO	SODESCO and Olimoni Navin	€67,677.5 €48,257	01/04/2010 to 30/06/2013
High-level policy dialogue on ICT for Reinforced EU-EECA Cooperation	FP7-ICT	SODESCO	n/a	01/12/2011 to 31/05/2014
GEO capacity building initiative in Central Asia	FP7-Environment	State Administration on Hydro-meteorology	€20,544	01/03/2010 to 29/02/2012
Authentication methodologies for metal artefacts based on material composition and manufacturing techniques	FP6-Policies	SODESCO	n/a	01/06/2007 to 30/11/2009
Interstate water resource risk management: towards a sustainable future for the Aral basin	FP6-INCO	Water Problem, Hydropower And Ecology Institute of Academy Of Sciences	n/a	01/11/2005 to 30/04/2009
Organizing Caucasus and Central Asian services for Internet offerings to National Research & Education Networks	FP6-Infrastructure	Tajik Association of Users of Academicians, Research and Educational Networks	n/a	01/11/2005 to 30/06/2008
A reconstruction of prehistoric Eurasian mythological motif complexes and their most ancient distribution in connection with genetic data	IC-INTAS	Institute of Humanities	n/a	01/11/2006 to 31/10/2008
Management of environmental risks from landfills in seismically active regions in the New Independent States of Central Asia	FP6-INCO	Chemistry Institute of Academy of Sciences	n/a	01/08/2005 to 31/07/2008
New language identity in transforming societies: Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan	IC-INTAS	Tajik National State University	n/a	01/05/2005 to 30/04/2007
Charge transport in metal-diboride thin films and heterostructures	IC-INTAS	Tajik Academy of Sciences	n/a	01/07/2002 to 30/06/2005
Opening up the European Research Area to Central Asia	FP6-INCO	Academy of Sciences	n/a	01/05/2004 to 30/04/2005
Echinococcosis: understanding of the epidemiology and transmission dynamics and recommendations for the surveillance and control in Central and Northern Asia	IC-INTAS	Tajik Veterinary Research Institute	n/a	01/05/2002 to 30/04/2004

Table 19. EU-funded research proposals and projects (continued)

Title	Category	Tajikistani Participants	EU contribution	Period
Crop irrigation management for combating irrigation induced desertification in the Aral sea basin	FP5-INCO 2	Tajik Institute of Reclamation and Civil Engineering	n/a	01/07/2000 to 31/12/2004
Democratic Opposition as a Consolidation Factor in Transitional Regimes: Comparative Analysis of Armenia, Kyrgyzstan, Russia and Tajikistan	IC-INTAS	Centre for Strategic Research under the President of Tajikistan	n/a	01/09/2001 to 29/02/2004
Models of managing conflict in post-Soviet States	IC-INTAS	Scientific-Analytical Centre "Sharq"	n/a	01/04/2000 to 31/03/2002
Correlates of extinction risk for Central Asian biodiversity	IC-INTAS	Institute of Zoology & Parasitology	n/a	01/10/2000 to 30/09/2002
Middle Palaeolithic Blade-Industries, Settlement Patterns, Chronostratigraphy and Palaeoenvironment of the Last Two Glacial Cycles. A Comparative Study between Central Asia and Europe	IC-INTAS	Ministry of Melioration Nikitin Institute of Chemistry	n/a	01/10/1999 to 30/09/2001
Growth of silver birch at elevated levels of carbon dioxide and ozone: Acclimatisation in photosynthesis, injuries and protection by ascorbate and terpenes	FP4-INCO	Institute of Plant Physiology and Genetics - Tajik Academy of Science	n/a	01/09/1998 to 31/08/2001
Palaeoclimate and the evolution of the environment in the Great Eurasiatic Plain during the last 150,000 years	IC-INTAS	Institute of Archaeology and Ethnography	n/a	01/06/1995 to 31/05/1996
Complex and Clifford analysis for treating systems of partial differential equations	IC-INTAS	Academy of Sciences	n/a	01/06/1995 to 31/05/1996
Central Asian loess: geochronology, correlation of palaeoclimatic events and environment of Ancient Man	IC-INTAS	Academy of Sciences and Institute of Archaeology and Ethnography	n/a	01/04/1995 to 31/03/1996
The regulation of ethnic and regional conflicts in the former Soviet Union	IC-INTAS	Tajik State University	n/a	01/09/1994 to 31/08/1995

Source: <http://cordis.europa.eu/>

At a more operational level, the EU research Framework Programmes are open to participation by researchers, research organizations and business innovators in non-EU countries. Throughout the new Horizon 2020 Programme (2014-2020), the Commission will identify opportunities for international cooperation and develop multiannual roadmaps that will be implemented through work programmes. Horizon 2020 is fully open to the participation of entities from across the world, including those from Tajikistan, in all parts of the programme, and many topics are flagged as being specifically relevant for cooperation with partners outside Europe¹⁹⁵. An Information Day on Horizon 2020 – the new Framework Programme of the European Union for Research and Innovation – took place in Tajikistan, Dushanbe on 24 February 2014.

¹⁹⁵ http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-a-countries-rules_en.pdf

7.5 Recommendations

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. While these relations provide opportunities for knowledge exchange and innovation, more could 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:

- *Further simplification of 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 an overarching 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; and*
- *Creating new opportunities for 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 traditional partners such as Russia, other ex-Soviet republics and some of Tajikistan's neighbouring countries. However, its universities and research centres are less well connected to scientific excellence centres 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 participation rate of Tajikistani researchers in cross-border and international cooperation programmes (and publications) in research and innovation by:

- *Creating incentives for 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 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 centres attractive for international visiting fellows;*
- *Organizing academic conferences and similar events in Tajikistan; and*
- *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 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 4.2). Develop, modernize and disseminate new curricula and internationally compatible teaching methods and/or materials; and*
- *Supporting educational modules in English and other foreign languages.*

Recommendation 7.4

While the Academy of Sciences displays 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 to tender launched by international funding bodies;*
- *A network of existing internationalization officers could be created and connected to similar bodies/associations in partner countries; and*
- *Creation of 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 should be provided to research and scientific staff (as well as PhD students) for the preparation of grant and other competitive funding applications, and draft proposals of all types aimed at international funding sources. This might involve:

- *A “Train the trainers” initiative whereby 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; and*
- *Offering training in a number of relevant areas such as academic writing in English, international funding opportunities, etc.*

Innovation Performance Review

The Innovation Performance Review contains the findings of a participatory policy advisory service undertaken at the request of the national authorities. It considers possible policy actions aimed at stimulating innovation activity in the country, enhancing its innovation capacity and improving the efficiency of the national innovation system.

This publication is part of an ongoing series highlighting some of the results of the UNECE Subprogramme on Economic Cooperation and Integration. The objective of the Subprogramme is to promote a policy, financial and regulatory environment conducive to economic growth, knowledge-based development and higher competitiveness in the UNECE region.

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