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Abstract	This document presents the Policy Mix Peer review of the Kyrgyz Research and Innovation System, implemented by a group of international experts in 2015-16. It includes a range of recommendations to improve the performance of the system.

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Report S&T Policy Mix Peer Review (PMPR) Kyrgyzstan

Implemented in 2015-2016 in the frame of IncoNet Central Asia

Prepared by an international team of independent experts:

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0 Abbreviations

EU	European Union
FSU	Former Soviet Union
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on Research and Development
HEI	Higher Education Institutions
ICT	Information and Communication Technologies
IncoNet CA	STI International Cooperation Network for Central Asian Countries
ISTC	International Science and Technology Center
IT	Information Technologies
KGS	Kyrgyz Som
Kyrgyzpatent	State Service of Intellectual Property and Innovation under the Government of the Kyrgyz Republic
MON	Ministry of Education and Science
NAS KG	National Academy of Sciences of the Kyrgyz Republic
NGO	Non Governmental Organisation
PMPR	S&T Policy Mix Peer Review
PRO	Public Research Organisations
R&D	Research and Development
R&I	Research and Innovation
SME	Small and Medium Sized Enterprises
S&T	Science and Technology
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO UIS	UNESCO Institute of Statistics

1 Executive Summary

The science sector of the Kyrgyz Republic has experienced since the independence of the country a period of 25 years of stagnation and degradation. It has been operating in a survival mode and received only very limited state funding (0.1 - 0.2% of GDP). Only since 2015 serious attempts and steps towards reform have started to be implemented.

In this context, the Kyrgyz Government requested a peer review of the Science and Technology policy mix (PMPR) of the Kyrgyz Republic in the frame of the EU funded project IncoNet Central Asia (IncoNet CA)[1]. The review was implemented in 2015 and finalised until summer 2016. The analysis covers S&T strategy and governance, Public Research Organisations (PRO) and Higher Education Institutions (HEI), Financing of Research, Research Personnel, and Innovation and the Private Sector, for which the following recommendations have been made:

Recommendation 1 – Strategy implementation & evaluation: After 25 years of stagnation a reform of the S&T sector, including innovation is urgent and timely. Many documents and strategies have been developed over the years, and it is important to **move from strategy development to strategy implementation**. First results of implementation can be seen (e.g. establishment of a National Science Foundation), which is encouraging. Strategy implementation needs involvement of all relevant stakeholders and proper **monitoring, evaluation and indicators for measuring advancement**. R&D statistics need to be improved and complemented in this context (e.g. on business R&D and innovation).

Recommendation 2 – Priority setting: A **more systematic priority setting** is required to focus the limited available resources on the pressing issues for Kyrgyzstan and promising scientific sectors for innovation. Foresight methods including expert groups, surveys and others are instrumental here. The participation of all relevant stakeholders in this process is required, including policy makers, researchers, business and NGOs. Also, the **remaining niches of excellence should be identified systematically**, for example by evaluating research institutes and research groups with the help of external /foreign experts.

Recommendation 3 – Evaluation of PROs and HEIs: A **systematic evaluation of PROs and HEIs, according to international principles and practices should be introduced,** to find out the strong research and innovation performers. The evaluation should apply at the level of the institution as a whole, as well as at the level of individual researchers and include the allocation of academic degrees and positions. **Foreign experts and representatives of the Kyrgyz scientific diaspora should be involved in the different forms of evaluation.** International grant givers (e.g. ISTC, UNDP) should be approached for supporting evaluation exercises.

Recommendation 4 – Encourage the strong research and innovation performers: Encourage and nurture the strong research and innovation performers (based on evaluation of indicators such as winning international grants, publishing in international journals, educating young researchers, cooperating with business, etc.), and **allocate appropriate funding to the successful groups.** It is

[1] http://www.inco-ca.net/

highly recommended not to reduce national funding for scientists, who are successful in winning international grants.

Recommendation 5 – Improve the quality of the Universities /Higher Education Institutions (HEIs): A streamlining and **improvement of the quality among HEIs is needed** based on their systematic evaluation (See Recommendation 3). It will be useful to install a **board at each of the main public HEIs** for supervising and advising on HEI strategy, for strengthening research at HEI, for linking the activities to the needs of the society and the economy, and for improving standards. The **board should include experts from abroad and from the scientific diaspora**. **Resources should be focused on the well performing universities** and those relevant to the economy, such as Polytechnic, Agriculture, and Medical Universities.

For improving the quality of HEIs, also **their research performance needs to be improved**. They should be better connected to research institutes, for example through joint curricula, grants for HEI-PRO collaboration, joint infrastructure usage.

Recommendation 6 – Reform the PRO sector, but safeguard its assets: A reform of the research sector and the Public Research Organisations is inevitable. It has been finally tackled in 2015 and needs to proceed for improving the research performance and its impact, for focusing resources on crucial research issues for the country and well performing institutes, for linking research and education, for facilitating research-business cooperation. The **assets of the PROs (e.g. research infrastructure, land, buildings), in particular of NAS KG, need to be safeguarded for the benefit of the research sector**. These assets should not be wasted to speculation and sell-offs, as has happened in other FSU countries.

Recommendation 7 – Research-business cooperation: Establish mechanisms and intermediaries **facilitating the cooperation between business and academia and the implementation of research results** produced by PROs and HEIs. Such measures may include collaborative grants for research-business cooperation, start-up support, technology transfer offices, brokers, incubators, competence centres. Introduce a legal framework for spin-offs from HEIs and PROs, and remove/avoid any barriers to the business development.

Recommendation 8 – Increase funding for Research and Innovation: For improving the research and innovation performance, as well as the economic perspectives of the country, **it is of utmost importance to increase the GERD as a share of GDP from the current very low levels of only 0.13% (in 2012) GERD as a share of GDP.** The increasing of funding should be **linked to planned reforms such as a competitive distribution of R&I funding**. Increased funding will help the reform to be successful. Furthermore, **all cost of research has to be covered**. It is not possible to perform research when only salaries and social security is covered: increase the salaries, invest in infrastructure and equipment. Check carefully all administrative costs and overheads, and try to make a maximum available directly for research.

Recommendation 9 – Funding against evaluation: The suggested modes of funding basic, programme and competitive/grant are commonly used and may be implemented. **Solid and independent scientific evaluation of project proposals to all the funding modes will be needed.**

Foreign experts and the Kyrgyz diaspora should be used for evaluation. Appropriate criteria and procedures to select the most promising projects and competitive research teams will have to be applied, for ensuring trust in the system. **Public R&I funding should be open to all research and innovation players,** including public and private organisations, and different types of organisations including HEI, PROs, BES (Business Enterprise Sector), NPOs (Non-Profit Organisations).

Recommendation 10 – Establish an independent Fund for R&I funding: Establishing a Fund for R&I support is a welcome development in Kyrgyzstan. **One new single Fund for allocating funding for basic and applied research as well as for support of innovation will be sufficient**, given the small size of the research community and of innovation activities.

The review team recommends independent research and innovation funding. While the Fund may be formally under the Ministry of Education and Science (MON), **its independence needs to be ensured**: it should be outside the structure of the Ministry and not directly be managed by it. The head of the Fund should be selected by international peers (e.g. heads of other R&I funds). The personnel should be selected on the basis of qualification. The Fund should possess a **Governing Board involving a broad range of R&I stakeholders** (Line Ministries, NAS-KG, Universities, business sector, and a consistent fraction of foreign experts). It will supervise the Fund's activities, strengthen its independent functioning and can constitute a buffer to harmful external interventions. Furthermore, the Fund must have **full responsibility and autonomy for the allocation of R&I funding**, and for the selection process of project proposals.

Key to success of the new Fund and acceptance of its funding decisions will be a **transparent, objective and fair evaluation procedure**. Transparent meaning that the evaluation criteria and procedures will be made public, and that the evaluation results will be made available to the applicants, including scores and comments of evaluators. Quality control, ex ante and ex post evaluation of research projects has to be done according to international criteria and with the help of international peers.

Recommendation 11 – Take advantage of international donors for supporting R&I: International grants and support from international donors should be used to the maximum possible. Efforts should be made in order to attract additional donors to research and innovation funding and support. UNESCO, ISTC, UNDP, World Bank, and others may be asked, for example, to support evaluation and assessment, innovation development and other activities.

Recommendation 12 – Research careers: Make research careers more attractive, in particular increase the salary levels. Popularisation of science (e.g. through Science Slam events, press coverage) could contribute to raise the prestige and relevance of science and of research careers.

Recommendation 13 – Scientific diaspora: Use the potential of the Kyrgyz scientific diaspora as far as possible, e.g. for joint research projects with colleagues remaining in Kyrgyzstan, exchanges/mobility, for evaluations in the country (e.g. of project proposals, boards), conferences, for education of young researchers abroad. The scientific diaspora should be researched systematically and a database should be built up.

Recommendation 14 – scientific education and labour market: Address the mismatches in scientific education and labour market requirements and make resources for equipment and materials available. Coordinate and consult with business to identify missing qualifications, and promote these fields of study.

Recommendation 15 – Support innovation policy at the governmental level: At the state level it is necessary to provide **more support for the development of national innovation policies, to improve coordination between the institutions, strategic documents, administrative and financial instruments which have an impact on the innovation system**. The current legislation relevant for innovation needs to be reviewed with a focus on providing a stimulating and non-bureaucratic environment for innovation activities (e.g. the law "On innovation activity"). Customs duties on imported specialized scientific equipment, which have no domestic analogues, should be removed.

Recommendation 16 – Innovation stimulation and research-business cooperation: Consider introducing suitable innovation stimulation instruments. **Collaborative grants are recommended for stimulating cooperation among research and business actors.** Other measures could include business contests, round tables, and brokerage events. **Study the international experience in innovation support,** in particular in other countries of the Former Soviet Union, to find suitable instruments for the country. **Attract extra-budgetary sources** - private investors, strategic partners and equity businesses for financing innovation activities, possibly in co-funding modes with public support.

Recommendation 17 – Enabling environment, education, priorities: Establish an enabling environment for innovative SMEs and for stimulating innovation development. Avoid or **remove any barriers to the creation of innovative businesses and of spin-offs from research institutes and universities, and stimulate such activities**. Identify **fields of innovation potential beyond the IT sector**, e.g. renewable energies and energy efficiency. Consider integrating innovation in education, e.g. in university curricula.

2 Introduction

Since the independence of Kyrgyzstan, the science sector has experienced a period of 25 years of stagnation and degradation. It has been operating in a survival mode with limited state funding which was used mainly for covering very low salaries. Nearly no investment into equipment or consumables was possible with national funding. The performance of research remained largely concentrated in Public Research Organisations, in particular in the National Academy of Sciences of the Kyrgyz Republic (NAS KG) and branch institutes under the Ministries, whereas the Higher Education Institutions (HEI, universities) were and are still focused on education. The HEIs experienced, however, a better financial situation. They could generate income through tuition fees, and to a very limited extent from the private sector. International grants helped to keep some of the research capacities in the country. Because of the unattractive framework conditions for R&D and because of vested interests, the public research institutions could not attract and retain young researchers. Research remained largely disconnected from the business sphere and innovation activities have been modest.[2] Some few niches of expertise and excellence could be kept. With Information and Communication Technologies (ICT) a promising innovative sector is developing. Several attempts were made to reform the science sector, but have not come far. Only in 2015 a substantial reform was initiated and first steps implemented (e.g. a reform concept was approved as a legal basis, a National Science Foundation was established). In the following chapters we will analyse core issues of the science system which are related to the mentioned challenges, and make recommendations for improvement of the system.

2.1 Methodology

A peer review of the Science and Technology policy mix (PMPR) of the Kyrgyz Republic was requested by the Kyrgyz government in 2014 in the frame of the EU funded project IncoNet Central Asia (IncoNet CA). It was implemented in the year 2015 and this report is the final result (and a Deliverable in the project IncoNet CA).

A policy mix peer review is a systematic examination and assessment of the national S&T system (including also innovation) by international experts which aims at improving the design and the implementation of national S&T policy. It is not an evaluation but a mutual learning process based on a critical friends approach.

For this S&T policy mix report a solid set of methodologies was used. A group of five external experts experienced in research and practice of S&T and innovation policies was tasked to perform the analysis of the Kyrgyz science system. These experts (or peers) were coming from research organisations, ministries of science and education, and governmental innovation agencies from the EU member states Austria, Estonia, Germany and Greece, and one expert from Kazakhstan. A preparatory report based on desk research was provided by the Kyrgyz hosts to the experts. A Kick-off meeting of the review took place in Athens in January 2015. It set the scene for the PMPR and

[2] For an assessment of the current situation see for example:
- IncoNet CA (2016). Kyrgyzstan country report, http://www.increast.eu/_media/Kyrgyzstan_Country_Report_EN_2016.pdf
- the Concept for a Reform of the Organisation of the Science System of the Kyrgyz Republic (2015), points 1.1. and 1.2., http://edu.gov.kg/media/files/90b50a26-00ea-4106-a365-6f64aa25d838.docx

established a common understanding on its main objectives. It also served to identify the key organisations and stakeholders to be interviewed, and to commonly decide on the schedule of the study mission. This preparatory work delivered a basis for a one week study visit to Kyrgyzstan in March/April 2015. This visit allowed to interview and hold discussions with the main stakeholders in the science field in Kyrgyzstan, such as the key ministries (Ministries of Education and Science, Health, Agriculture, Energy), major research organisations (Academy of Science, Universities), international organisations (EU delegation, UNDP, ISTC, etc.) and other important public and private stakeholders such as the National Statistical Committee, etc. Quantitative and qualitative analysis of the information gathered was performed and integrated in this report. Financial data in the report were calculated according to an average exchange rate of € 1 = KGS 68.[3]

The analysis is presented in five core chapters on S&T strategy and governance, Public Research Organisations and Higher Education Institutions (HEI), Financing of Research, Research Personnel, and Innovation and the Private Sector. Each chapter concludes with a range of recommendations for actions to be taken for improving the situation of science, research and innovation in Kyrgyzstan.

3 Strategy/Priorities/Governance

S&T policy and research is based in Kyrgyzstan on the following legal basis:

- Law of the Kyrgyz Republic "On Science and Foundations of State Science and Technology Policy" dated 15 April 1994;[4]
- Law of the Kyrgyz Republic "On innovation activity" dated 25 October 1999;
- Law of the Kyrgyz Republic "On the National Academy of Sciences of the Kyrgyz Republic" dated 28 June 2002;
- Law of the Kyrgyz Republic "On Education" (2003);
- Law on the “Reform of the Organisation of the Science System of the Kyrgyz Republic” (2015).[5]

In addition, several strategy documents for research and innovation have been developed. Priority areas for R&D were proposed by the Council for Science and Technology of the Ministry of Education and Science on the basis of the National Strategy of Sustainable Development 2013-2017, Strategy of Development of Education 2012-2020 and on proposals of other Ministries and organisations. Priority areas specified by the Council are:

- Ecology and the environment;
- Biotechnology (in industry, medicine, agriculture);
- Research in the field of natural sciences and engineering;
- Research in the field of medicine and health care;
- Agriculture;
- Processing of raw materials and products;

[3] The average exchange rate € 1 = Kyrgyz Som (KGS) 68 was calculated over the first half year 2015 (January – June) on the basis of exchange rates provided by the European Commission, Programming and Budget: http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm

[4] See: http://edu.gov.kg/media/files/ca6e4822-f10d-4631-869c-abee5b03ffda.docx

[5] See: http://edu.gov.kg/media/files/90b50a26-00ea-4106-a365-6f64aa25d838.docx

- Fundamental and applied research in the field of economic, social, humanitarian and political sciences;
- Information and communication technologies.

A slightly revised version of priorities valid for 2017-2020 has been published at the website of the Ministry of Education and Science (MON). An explanatory text specifies the priorities more in detail.[6] The new priorities are not very different from the previous ones. They include for example a more applied topic with tourism and transport, while the more basic research oriented topic of natural sciences and engineering dropped out. The priorities are:

- Rational use of natural resources
- Food security (agriculture)
- Information technologies
- Health and quality of life
- New technologies in the energy field
- Development of tourism and the transport sector
- Social and human sciences

Also the Academy of Sciences has developed a comprehensive strategy document,[7] where priority areas and a substantial reform of the academy have been envisaged. It starts with a realistic and dire self-assessment of the state of science in NAS KG and Kyrgyzstan. It highlights the low financing of the research institutes from the state budget and the low payment of R&D personnel leading to brain drain and lack of young scientists. The structure of NAS KG is described as flawed, hindering a focusing of resources on priority areas for R&D. The output of the research institutes is not measured yet appropriately, as no indicators for its assessment have been specified. Organisational and legal barriers are in place between research and education, and these block the transfer of scientific achievements to their application in education.

The planned reforms of NAS KG would include the introduction of competitive funding, of indicators for assessment, and of financial stimulation measures, which should be based on results of the research work. However, the implementation of the reforms has not come far until 2015, when this review was undertaken. Priority research areas for the period 2013-2017 have been specified in the academy's strategy document:

- Water and energy resources, renewable energy;
- New technologies and materials (biotechnology, nanotechnology);
- Information technology, mathematical modelling and management issues;
- Mechanical engineering and instrument engineering;
- Geosciences and natural resources;
- The reproduction of biological resources and bio-security;
- Problems of ecology, human ecology and climate change;
- The individual and society: the challenges of globalisation

[6] See: http://edu.gov.kg/ru/science/

[7] National Academy of Sciences of the Kyrgyz Republic (2013), Strategy for the Development of the National Academy of Sciences of the Kyrgyz Republic, 2013-2025.

Regarding innovation, a strategy has been developed by the State Service of Intellectual Property and Innovation under the Government of the Kyrgyz Republic (Kyrgyzpatent), but its implementation has not been initiated or scheduled yet. This strategy process seemed not really coordinated with the Ministry of Economy, which on its side has also been in the process of developing an innovation strategy in spring 2015. Furthermore, the strategy processes seemed disconnected from R&D and coordination with the Ministry of Education and Science. These strategy development processes should have been coordinated.

The most recent strategy document concerns the Reform of the Organisation of the Science System of the Kyrgyz Republic (2015). It features fundamental changes to the current system in terms of research governance, personnel, and funding.

First, what concerns the governance of research, a new Council for Research and Innovation has been established under the Prime Minister. A Department for Science within the Ministry of Education and Science is responsible for managing the new Science Fund for allocating research funding. A reorganisation of the National Academy of Sciences (NAS KG) and of branch research institutes is under way, reducing the relevance of NAS KG in the science system and which will lead to a stronger integration of research institutes with Higher Education Institutions.

Second, a reform of the education and attestation of the research personnel is on the agenda. This will increase the quality and publication requirements for PhDs and scientific personnel (lecturers and professors), reforms of PhD commissions by including independent/external experts, improving transparency of PhD procedures (electronic database and publication of thesis).

Third, funding will be allocated in three forms in the future, basic funding, targeted programme funding, and grant funding. Expert commissions will be convened for project selection.

It is certainly important to consider and discuss the way forward for science, and also for education and innovation. Several reforms were under discussion for the science sector in previous years (interview partners mentioned five such earlier attempts), whereby none of them has been implemented. This situation has obviously changed, and the reform undertaken in 2015 is in the implementation phase. A lot of turnover among policy makers responsible for science was also noted by interview partners.

3.1 Assessment

- **A reform of the research sector is necessary**. After 25 years of stagnation it is urgent and timely. It is high time to take the next step **from strategy development to strategy implementation**. Reforms have been discussed and conceptualized in various documents, but it will be necessary to take decisions and implement measures.
- Strategies have been developed for interlinked sectors separately. However, the **strategy development should be done in a comprehensive approach, coordinating and integrating research, development, innovation and higher education.** Strategy development should be implemented under the guidance of the relevant ministries (in particular the Ministry of Education and Science and Ministry of Economy), and it needs to **involve all the stakeholders**

concerned, ranging from policy makers in parliament, ministries and agencies, researchers, business, and NGOs.

- Research priorities are included in the National Development Strategy, as well as in the Strategy of Academy of Sciences development, and were published by MON. However, several interview partners mentioned that the priorities were not well defined and the selection process of priorities seemed unclear. **Priority setting should therefore be tackled more systematically**. This could be done with a foresight exercise or with certain foresight methods (expert group discussions, surveys, interviews, etc.) with help from foreign expertise. For example, in Kazakhstan such a foresight process was implemented[8].
- A coordinated approach and **a focusing on the pressing and promising issues for Kyrgyzstan are required**. Some were mentioned in the discussions with stakeholders, e.g. agriculture and food processing, geology and water issues, health and the medical field, light industry. Moreover, the **remaining niches of relative excellence in the country have to be identified**. The research should be brought closer to the needs and economic opportunities of the country.
- All relevant stakeholders, including **policy makers for R&I, researchers, business, NGOs, and society need to be involved in the further elaboration and implementation of the reform process and in priority setting.** An active civil society is available in the country, which can support this process.
- Assessment/Evaluation is a crucial issue in this context. Evaluation should be applied for all different issues and according to internationally agreed indicators: **evaluation of research institutes, of research projects, of research outputs/implementation**. To break out of the vicious circle of vested interests, of persistence of old-boys networks, and of corruption, it **is needed to involve experts from outside the country and from the scientific diaspora**, who are ready to support the reform efforts.
- **R&D and Innovation statistics will need to be improved and complemented**, as this is crucial for benchmarking with other countries.

Recommendation 1 – Strategy implementation & evaluation: After 25 years of stagnation a reform of the S&T sector, including innovation is urgent and timely. Many documents and strategies have been developed over the years, and it is important to **move from strategy development to strategy implementation**. First results of implementation can be seen (e.g. establishment of a National Science Foundation), which is encouraging. Strategy implementation needs involvement of all relevant stakeholders and proper **monitoring, evaluation and indicators for measuring advancement**. R&D statistics need to be improved and complemented in this context (e.g. on business R&D and innovation).

[8] For example in 2010 a foresight study was implemented under the National Innovation Fund (NIF) of Kazakhstan; see: Manfred Horvat, Jean-Luc Clement, Margit Harjung, AT, Kirsten Kienzler, Zygmunt Krasinski, Vardan Sahakian, Michael Schlicht (2012). S&T Policy Mix Peer Review for Kazakhstan.
Later on the National Center of Science and Technology Evaluation has been dealing with foresight, see: http://www.ncste.kz/en/content/foresight

Recommendation 2 – Priority setting: A **more systematic priority setting** is required to focus the limited available resources on the pressing issues for Kyrgyzstan and promising scientific sectors for innovation. Foresight methods including expert groups, surveys and others are instrumental here. The participation of all relevant stakeholders in this process is required, including policy makers, researchers, business and NGOs. Also, the **remaining niches of excellence should be identified systematically**, for example by evaluating research institutes and research groups with the help of external /foreign experts.

4 Public Research Organisations (PROs) and Higher Education Institutions (HEI)

Three principal types of institutions dominate the science landscape of Kyrgyzstan:

- The National Academy of Sciences of the Kyrgyz Republic (NAS KG),
- The Higher Education Institutions (HEIs) and
- The Sectoral Scientific Research Institutions

The National Academy of Sciences

NAS KG has a leading role in the research system, inherited from the Soviet times. According to the Annual Report of the Academy for the year 2014, 25 scientific organisations operated under the auspices of NAS KG with a total staff of 1.989, out of which 1040 were researchers. In line with the national attestation model, 193 of them were doctors and 383 candidates of science.[9]

NAS KG is funded directly from the state. The budget has dramatically decreased over the last two decades, creating several problems and negative consequences. In 2015, the state funding for NAS KG constituted only 0.08% of the GDP. The wages are extremely low (on average about KGS 4,000 / €60 per month), turning research careers unattractive. Most of the scientific personnel has a part time job outside NAS KG and many are pensioners. Teaching at universities is an important opportunity for an additional income for the academy staff. However, there were complaints among the interviewees that the quality of higher education has dropped over the years.

Furthermore, stakeholders mentioned that an over-proportionate share of the state funding is used to cover the administrative costs of the Academy and its Presidium. The Presidium consists of the President, two Vice Presidents and 5 Advisors. The state budget barely covers the salaries of the academy staff and leaves no opportunities for purchase of new equipment, field works, mobility, and organisation of conferences.

[9] National Academy of Sciences of KG, Annual Report 2014, http://www.nas.aknet.kg/index.php?menu=21

Ageing and brain drain seriously affect the scientific potential of NAS KG. Overall, the scientific staff of NAS KG decreased by 2.5 times from 1991 onwards. There are not enough incentives and capacity to attract and retain the young generation of scientists. Many have moved and continue to move abroad, mostly to China and Japan, but also to Kazakhstan, Russia (Moscow and Novosibirsk), USA and Western Europe. Only 26% of the scientists of NAS KG are under 35 years old.

NAS KG has its own buildings and important real estate property in Bishkek. Several academicians expressed concerns about the fate of this property, if the status of the NAS KG changes after the forthcoming reform, given the high interest for new constructions in the city. A serious deterioration of the laboratory facilities and equipment was observed, most are outdated.

NAS KG elaborates its own research strategy, which is approved every year by the Presidium. It carries out both basic and applied research in fields such as materials, energy, water sciences, geology and geomechanics, biology, ecology, climate change and others. In contrast with the Soviet times, where research directions were dictated by the state, priority setting is mostly based on continuation of available specialisations and on the scientific interests of the Academy. Only few effective links to the needs of the real economy have been established.

Interviewees argued that on several occasions interesting applicable results have been produced, for example in water management, drilling and construction devices and equipment, an innovative biotechnological method for gold extraction, genetic material of local species, and seismic mapping. However, implementation of research results is currently very limited. A Technopark for supporting innovation was created at NAS KG, but due to limited resources it supports the implementation of a very limited number of innovations only (1 or 2 per year). It carries out mostly contract research. Lack of demand on behalf of the existing businesses, absence of appropriate support mechanisms, intermediaries and links to the real economy, as well as strong research–oriented (and not innovation-oriented) mindsets of scientists create an important gap between research and production. Furthermore, no legislation on implementation of research results has been introduced so far.

The Higher Education Institutions

Compared to the size of the population (5.776.600 in 2014),[10] the number of universities in Kyrgyzstan is large: according to information received during the fact finding mission, there are currently 52 Universities in the country, 24 of them are state funded. During the Soviet period, only 3 State Universities existed. After the collapse of the Soviet Union, universities proliferated responding to the increasing social demand for tertiary education, in particular in economics, the social sciences, and humanities, meanwhile the economic situation deteriorated. Here again, the system is characterized by low salaries and obsolete equipment. University professors often teach in several universities in order to secure a complementary income.

The main activity of universities is teaching, while research activities are rather limited. The state budget, allocated from the Ministry of Education and Science, is mostly used to cover salaries; important shortages on consumable materials, limited access to data bases and international

[10] National Statistical Committee of the Kyrgyz Republic (2016). http://www.stat.kg/en/statistics/naselenie/

journals, lack of data, as well as no internet connections in remote parts of the country have been referred to as major problems.

The higher share of universities' income comes from tuition fees, and several universities are fully dependent on tuition fees. The size of tuition fees varies, they amount usually to about 700-800 USD per year; the state makes only about 5.000 grant financed free study places available each year.

Some universities are of a regional scale. As an example, the University of Central Asia has branches in Tajikistan, Kyrgyzstan and Kazakhstan and plans to establish regional units with different orientations (IT, Earth Sciences, Engineering etc.)

Six Universities have already introduced the Bologna PhD system. However, there are concerns about the readiness of the HEIs to comply with the relevant requirements and admittedly, the general level of the higher education system does not meet international standards.

The Sectoral Scientific Research Institutions

A number of branch research institutes (22) are linked to different ministries. Most important are those under the Ministry of Agriculture and the Ministry of Health. Even though they are formally connected to the respective ministries, the latter have no control over their budget and decision making power.

In the field of agriculture, there are 5 institutes under the auspices of the ministry that have been integrated into the Agricultural University. According to the ministry, this integration resulted in a deterioration of the research performance of the institutes, and a worsening of their financial situation. The level of funding decreased to a threshold barely sufficient for labour costs; field works are covered by the researchers on their own means. No specific budget for research in the agricultural sector is foreseen, despite the fact that the ministry has identified the main national priorities (such as seed production, soil science and engineering, veterinary, irrigation, livestock feed, biodiversity). No effective links exist between the Ministry of Agriculture and the Academy of Sciences in order to define common strategies. The research agendas, once again, are not related to the needs of production. Yet, Kyrgyzstan has large areas of arable land, local varieties of livestock, and many private farming companies, potentially requiring specific scientific support, are active in the country. As an example, no scientific knowledge was available to assist a private company willing to breed a special horse variety.

In the health sector, a number of institutes are active under the respective ministry, covering almost all the relevant scientific fields. The situation is similar as in agriculture, since funding is allocated through the Ministry of Education and Science. A number of important deficiencies were described by the ministry representatives, who were quite pessimistic about the general situation of the sector as a whole. Lack of appropriate funding does not allow the purchase of modern equipment, an element of utmost importance to achieve international standards of research activity in biological and biomedical sciences. In addition, scientists and technicians have no opportunities for training in modern techniques. Ageing of the research personnel and old fashioned mentalities, fixed to the Soviet model, as well as lack of high impact publications in international journals were reported as principal weaknesses.

4.1 Assessment

Undoubtedly, the **level of state funding for research is far too low** to support a vibrant research community and state of the art public research institutions. Available statistics indicate an average Gross Expenditure for Research and Development (GERD) of only 0,13% of the GDP (in 2014),[11] which is one of the lowest among the Central Asian countries. Low salaries, deterioration of facilities and equipment, low interest to undertake careers in research on behalf of the young generation, ageing of the research community and important brain drain are the immediate consequences of such a situation. According to data, a dramatic shift of the interests of the young generation towards activities other than science can be detected: the average age of doctors is 60 years, that of candidates 45 years, and just 14 % of scientists are under 35 years old!

Tuition fees are currently the key source of funding for universities, but their contribution to research activities is not evident, since most universities are exclusively performing teaching. Some university stakeholders mentioned though that few universities are starting to try to put a limited share of tuition income aside for research activities. Links with the Kyrgyz scientific community in the diaspora are loose and no substantial collaboration with local researchers has been developed so far.

Contribution of the private sector to GERD is supposed to be negligible, although no exact data are available. The demand for research results on behalf of the local companies is low, and there are **no provisions or mechanisms for technology transfer from academia to industry**. Multinational companies in the mining sector do not rely yet on know-how produced by the local research institutions, nor collaborate with them. The situation is a bit different in the energy sector, where investment of the Russian Gasprom has allowed establishing cooperation with the research institute ENERGIA under the Ministry of Energy. A certain potential for implementation of research results by small and medium sized companies, as well as for creation of innovative start – ups, especially in the ICT sector, was noticed. In general, research priorities do not respond to the needs of the production sector. No legislation encouraging the creation of academic spin offs has been introduced so far.

International projects and grants are strongly contributing to preserving a certain level of research activities and equipment in some institutions. Interesting examples are a project supported by the Russian company GAZPROM in the field of energy and nuclear physics, the CAREN regional research and education network, ISTC projects in several thematic areas, such as seismology and anti-seismic constructions, medicine, biology, specific scientific issues for highlands, glaciers, the Issyk-Kul lake etc., UNDP projects for fisheries and aquaculture, cooperation with China in the fields of geology, and other international grants in molecular biology, biodiversity, water problems and others.

Publications in international journals are limited. High costs, language barriers, limited motivation and stimulation to publish, limited availability of grants for international cooperation, and poor participation in international networks and consortia are obstacles restricting the visibility of the research activities outside the country.

[11] UNESCO Institute of Statistics (UNESCO UIS, 2015).
http://www.uis.unesco.org/DataCentre/Pages/BrowseScience.aspx

Last but not least, **only very limited evaluation** of the scientific organisations and HEIs has been conducted so far, either at the level of the institutions or at the level of the scientific personnel. No criteria and standards for performances in science or education have been introduced, allowing for transparent and reliable procedures for the funding of institutions or the promotion of individual researchers. Personal relationships prevail; corruption and bribery affect the whole science and education sector.

Reforming Public Research Organizations

Against this background, following a request of the Prime Minister, a "Concept" aiming at reforming the science system in Kyrgyzstan has been elaborated by a Working Group.

The concept foresees, among others, a radical reform of the public research system including the re-organisation of the National Academy of Sciences, the integration of academic institutions into universities, the introduction of a new model for training and qualification of scientific personnel, as well as a shifting from regular state funding to targeted and competitive funding. The status of NAS KG will be transformed to a public research institution receiving funding through the "Science Development Fund", which will be the only body authorised to allocate state funding for scientific activities, according to the country's priority areas. Changes in NAS KG governance, including the structure and functioning of the Presidium are also foreseen.

To streamline the system and avoid duplications and redundancies, the concept foresees that NAS KG Institutes could evolve towards different directions: merge with state universities operating in the same scientific areas, become independent research institutes, participate to public – private partnerships or remain under the auspices of NAS KG.

Undoubtedly, a thorough reform of the Academy of Sciences and other public research organisations is urgently needed. The continuation of a system more than 25 years ago inherited from the Soviet Union, but with dramatically reduced funding has led to decline in equipment, scientific and innovative achievements, and depletion and ageing of staff. **Research also will need to establish stronger links to the business sector** and produce useful results for the local economy. A **focusing of the limited resources on key competence fields is inevitable.**

However, different stakeholders raised concerns about various elements of the proposed reform. In most cases, worries for a further deterioration of the research quality if academic institutions merge into universities have been expressed. Furthermore, there are doubts about the maturity of Kyrgyz universities to apply the Bologna system.

To guarantee a smooth transition, a thorough evaluation of public institutions should be carried out before deciding their future under the reform. **International principles and standards for such an evaluation should be introduced and foreign experts should also be appointed to ensure transparency and credibility of the whole procedure**. The case of the agricultural branch research institutes should be studied as a pilot example, to **learn from previous experience for the current reform efforts**. Additional pilot cases, for one or more institutes, which could be transferred to HEIs could be launched as test cases, before applying general horizontal measures.

Evaluation needs to be transparent and objective. Indicators will have to be specified to this end, and could include issues such as:

- Publications
- International grants
- Education of young scientists
- Priority of the topic /institute for the country

Research organisations in Kyrgyzstan need to adapt to the challenges of the current era in order to be able to collaborate and compete at the international level, and to integrate into international research networks. Given the low level of state funding, as well as the specific socio-economic needs of the country, **research should focus on a limited number of priorities**. Consequently, research activities of PROs and HEIs should help solve pressing issues for the country and support the socio-economic development of Kyrgyzstan. Available niches of excellence need to be continued, but building and preserving introverted ivory towers for science have to be considered a luxury.

State funding has to be wisely distributed to further enhance performance of the most active PROs and HEIs. Spreading the limited resources on an equal footing to all research groups will lead to a waste of resources and limit the impact of funding. Cases were reported during the interviews, where the national funding for scientists was cut back, just because they were successful in winning international grants and could cover research costs from those grants. The funding strategy should be opposite: **strong performers, which are competitive internationally, should not be cut back, but further supported**. A systematic evaluation of PROs and HEIs will help in identifying the strong performers. Separate evaluations to assess the performances of HEIS on research as well as on education need to be considered.

Some reorganisation of scientific structures has already taken place by the time of the mission of the peer review mission in 2015, but in general the science organisation reminded Soviet times when higher education and research were mostly separated. Modern higher education relies on high-level research. For developing a sustainable high quality university system it is needed to create at least a certain number of **research universities, where research and education are well connected**.

Recommendation 3 – Evaluation of PROs and HEIs: A **systematic evaluation of PROs and HEIs, according to international principles and practices should be introduced,** to find out the strong research and innovation performers. The evaluation should apply at the level of the institution as a whole, as well as at the level of individual researchers and include the allocation of academic degrees and positions. **Foreign experts and representatives of the Kyrgyz scientific diaspora should be involved in the different forms of evaluation.** International grant givers (e.g. ISTC, UNDP) should be approached for supporting evaluation exercises.

Recommendation 4 – Encourage the strong research and innovation performers: Encourage and nurture the strong research and innovation performers (based on evaluation of indicators such as winning international grants, publishing in international journals, educating young researchers, cooperating with business, etc.), and **allocate appropriate funding to the successful groups.** It is highly recommended not to reduce national funding for scientists, who are successful in winning international grants.

Recommendation 5 – Improve the quality of the Universities /Higher Education Institutions (HEIs): A streamlining and **improvement of the quality among HEIs is needed based on their systematic evaluation**. It will be useful to install a **board at each of the main public HEIs** for supervising and advising on HEI strategy, for strengthening research at HEI, for linking the activities to the needs of the society and the economy, and for improving standards. The **board should include experts from abroad and from the scientific diaspora**. **Resources should be focused on the well performing universities** and those relevant to the economy, such as Polytechnic, Agriculture, and Medical Universities.

For improving the quality of HEIs, also **their research performance needs to be improved**. They should be better connected to research institutes, for example through joint curricula, grants for HEI-PRO collaboration, joint infrastructure usage.

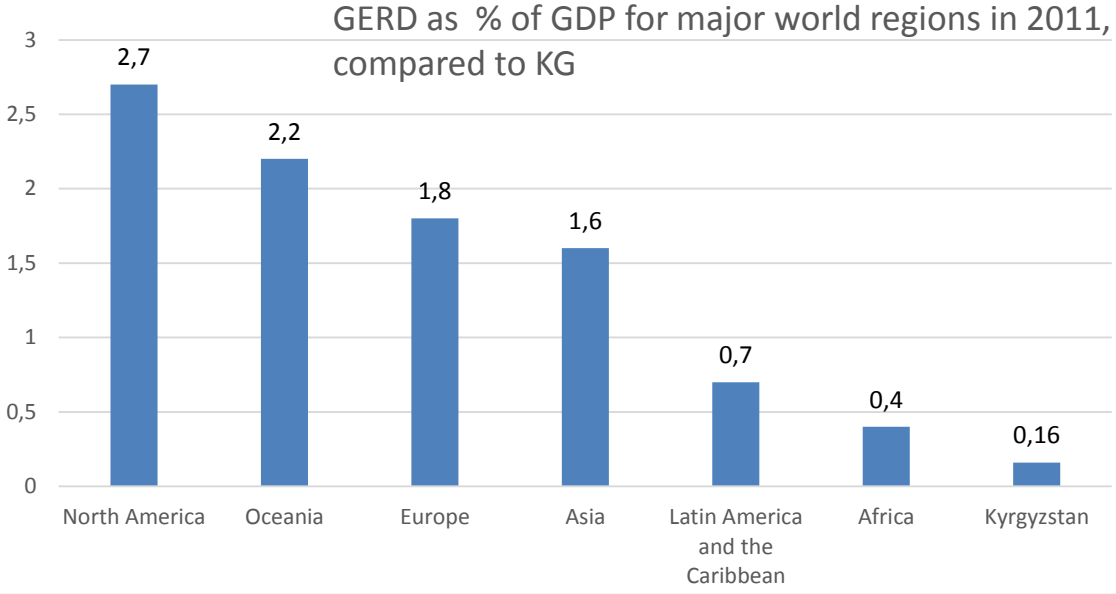
Recommendation 6 – Reform the PRO sector, but safeguard its assets: A reform of the research sector and the Public Research Organisations is inevitable. It has been finally tackled in 2015 and needs to proceed for improving the research performance and its impact, for focusing resources on crucial research issues for the country and well performing institutes, for linking research and education, for facilitating research-business cooperation. The **assets of the PROs (e.g. research infrastructure, land, buildings), in particular of NAS KG, need to be safeguarded for the benefit of the research sector**. These assets should not be wasted to speculation and sell-offs, as has happened in other FSU countries.

Recommendation 7 – Research-business cooperation: Establish mechanisms and intermediaries **facilitating the cooperation between business and academia and the implementation of research results** produced by PROs and HEIs. Such measures may include collaborative grants for research-business cooperation, start-up support, technology transfer offices, brokers, incubators, competence centres. Introduce a legal framework for spin-offs from HEIs and PROs, and remove/avoid any barriers to the business development.

5 Financing of research

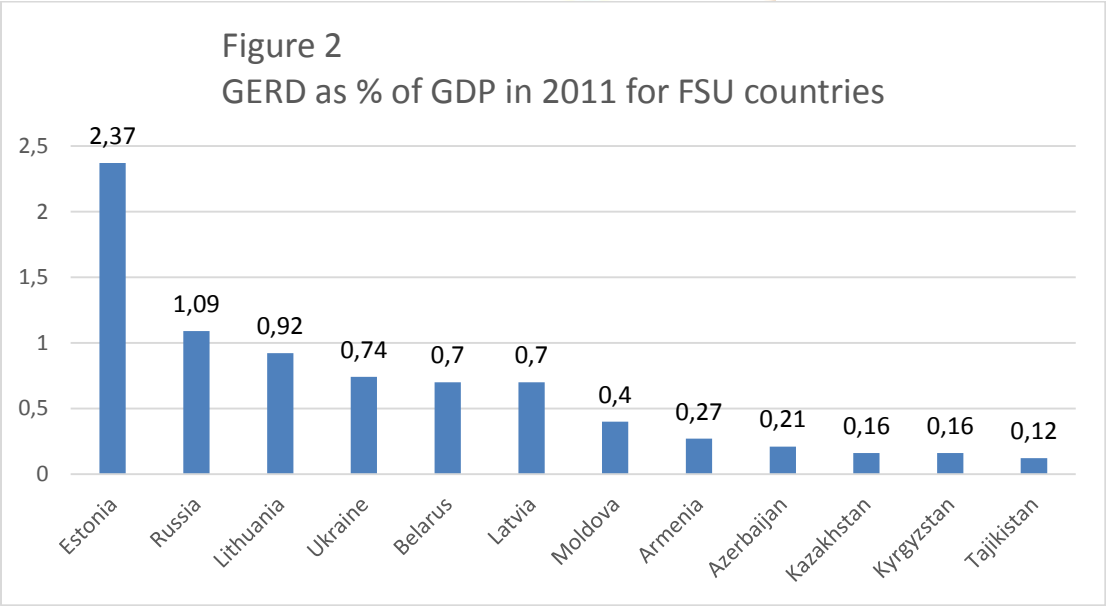
In Kyrgyzstan resources for research are very limited. Due to the difficult economic situation and the budget deficit, Gross domestic Expenditure on R&D (GERD) as share of GDP has decreased from 0.2% in 2007 to 0.16% in 2011, and even further to 0.13% in 2012. This is a very small value at regional and global scale (Figure 1). According to the Ministry of Finance, it will remain most probably stable at this level for the years to come.

Figure 1.
GERD as % of GDP for major world regions in 2011, compared to KG



Also in comparison to other countries of the Former Soviet Union, the share of GDP devoted to R&D activities is low (Figure 2). Countries such as Armenia and Moldova, which are also in a difficult economic situation, spend significantly more on R&D in relation to their GDP as Kyrgyzstan.[12] The situation in Kazakhstan is different, as it has a substantial GDP due to basic materials production. Even if its share of GDP which is spent on R&D is low, in absolute figures it is more significant.

[12] For data see UNESCO-UIS (2015).



The law of the Kyrgyz Republic "On Science and Foundations of State Science and Technology Policy" (1994, revised in 2008) states that the task of the government is to fund the research activities from the state budget and to take measures to maintain the research potential of research institutions. The Government allocates funds for scientific research work on an annual basis.
The law foresees the possibility to support:

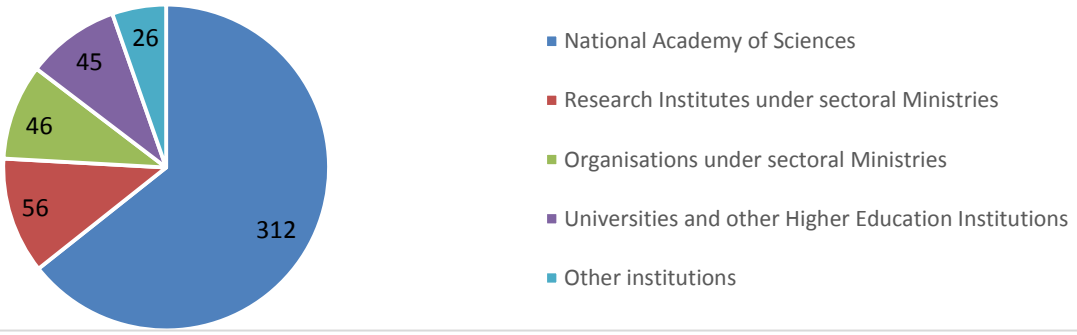
- Fundamental research and development,
- Research performed in the framework of the priority directions of science and technology,
- Applied research and development, the results of which have to be of national importance,
- Work related to scientific and technological cooperation based on international agreements.

Government may allocate support to science through:

- Basic funding as a means to support basic research conducted at research institutions and universities,
- Targeted funding for research and development in the priority areas of science and technology programmes,
- Financing of contract research and development in form of grants.

According to the records of the National Statistical Committee of the Kyrgyz Republic in 2013, expenditure on R&D of research organisations, research institutes and universities was in total 485 million KGS (€ 7.1 m). Expenditure on R&D of the National Academy of Sciences and of sectorial Academies was 312 million KGS (€ 4.6 m), expenditure of research institutes under sectorial ministries was 56 million KGS (€ 0.8 m), expenditure of organisations under sectorial ministries was 46 million KGS (€ 0.7 m), expenditure of universities and other higher educational institutions 45 million KGS (€ 0.7 m), and all other institutions 26 million KGS (€ 0.4 m) (Figure 3).

Figure 3.
Distribution of R&D expenditure in 2013 by type of research organisation

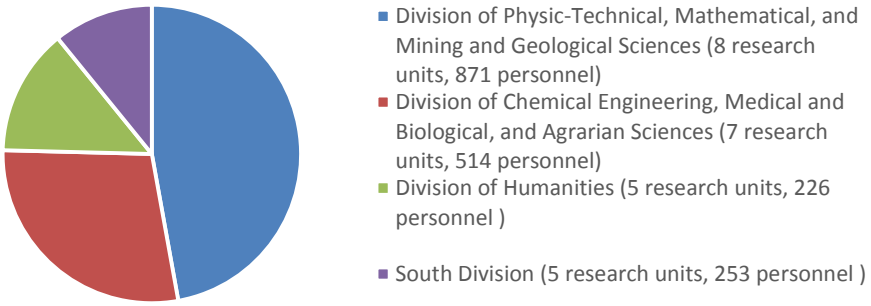


Since 2011 the state science budget was allocated only in two separate lines. The Ministry of Education and Science and the National Academy of Sciences (NAS) receive the state funding. Prior to 2011 the Ministry of Agriculture also funded its sectorial research institutes. In 2011 these institutes were transferred under the authority of the Kyrgyz State Agrarian University. In 2014 about KGS 150 million (€ 2.2 m) were allocated to the Ministry of Education and Science for university science and applied scientific research work and around KGS 250 million (€ 3.7 m) were allocated to the National Academy of Sciences.

The Ministry of Education and Science funded in 2014 projects in the priority areas that have been proposed by Council for Science and Technology of the Ministry of Education and Science. In total 118 projects in 46 research institutes under the authority of universities or sectorial research institutes with a total amount of about 149 million KGS (€ 2.2 m) were funded. In these projects, the money was allocated only for salaries and social security of personnel. Due to limited funds no other cost of research like research infrastructure cost, supplies for research or travel cost were able to be covered.

In 2014 the National Academy of Sciences (which includes 25 research institutions) received from the state budget 250 million KGS (€ 3.7 m). From this amount 0.5 million KGS (€ 7.350) were used for purchase of equipment, 1.2 million KGS (€ 17.650) for capital repairs, 4.4 million KGS (€ 64.710) for other costs; these cost categories summed up constitute in total 6.1% of state allocations to NAS. Also in the case of NAS, the majority of money allocated was used to cover salaries and social security of personnel. 88.6 % of the state allocation was given to 4 divisions of NAS. The distribution of the state budget allocations between different divisions of NAS is shown in Figure 4.

Figure 4.
Distribution of State Budget allocations in 2014 between different divisions of NAS



In addition to state budget allocations, research activities at the NAS were funded by international research grants. In 2014 NAS received 72 grants with budget 1,202 million $ (about 73 million KGS). This funding is the main source to cover other research costs besides salaries and social security of personnel. Division of Physical-Technical, Mathematical, and Mining and Geological Sciences received 10 research projects – 0.338 million $ (about 20.6 million KGS); Division of Chemical Engineering, Medical and Biological, and Agrarian Sciences received 43 projects – 0.797 million $ (about 46.9 million KGS); Division of Humanities received 3 projects – 0.023 million $ (about 1,403 million KGS) and South Division 16 projects – 0.043 million $ (about 2.6 million KGS).

Main providers of international grants have been the International Science and Technology Center (ISTC), the International Association for Cooperation with Scientist of the Former Soviet Union (INTAS), and others.

Some additional funding for research activities came to the Academy of Sciences from other sources (KGS 440.000 from Ministry of Education and Research projects and KGS 19.800 from contractual research). Total non-state budget funding was 37.3% (95.2 million KGS) of the total budget of the National Academy of Sciences.

In 2014 total state budget allocations for research and development were only 0.1% of GDP.

5.1 Assessment

The expert group had several meetings with scientists and administrators of research institutes and universities. The impression from these meetings was that the level of **funding of research in the Kyrgyz Republic is extremely low and governmental financing of science covers only a very low level of salary and social security.** All the other funding needs for research have to be covered from other sources. Several interview partners mentioned that the **current (at time of the review mission) allocation of the R&D budget was not transparent, criteria were unclear and that the allocation were prone to corruption**. Let us note that about one third of the R&D budget is allocated by the Ministry of Education and Science (Minobrnauki) and about 50% receives NAS-KG.

Some support for research has been provided by international grants, but usually they are given on a competitive basis and a successful application presumes a high level of research. In these circumstances, performing high level of research is extremely difficult.

Modern science is very costly and research infrastructure needs are similar in all countries despite the geographical location. **For small countries it is difficult to maintain two separate systems of research, one at universities and another at the Academy of Sciences.** Many post-soviet countries have undertaken reforms of their research system. At the same time it is not possible to simply copy reforms as every country has its own history, culture, and its own needs of the economy. However, policy learning from other countries is highly important and **reforms that other countries have undertaken should be studied and if found useful, adapted to the needs of Kyrgyzstan.** In any case, it is important to find the right balance between the needs and possibilities of the country.

The need for a substantial reform of the science system, including a reform of the science funding system, is recognized in Kyrgyzstan and preparation for this started some time ago. Aim of the current reform of the science system is to increase its effectiveness. **For the reform to be successful it is still needed to increase the total level of funding of research and innovation** as the lagging behind is so great. Funding of science is investment in the future; this investment will ensure a high level of education at universities, which in turn ensures provision with high level graduates capable to develop the society and economy of the country.

Reform plans have developed quite far, and a lot of discussion among the scientific community has taken place. A draft concept of reform has been prepared for governmental decision. In case of funding of science, the reform concept foresees a concentration of existing scientific, financial and organisational resources to implement the scientific and technological policy of the country. Furthermore mechanisms will be established for developing a modern scientific base of higher education institutions and for developing the capacities of human resources in the science field, which should lead to an improved efficiency and quality of research. An important place has been devoted to the development of principles of competitive financing, which should enhance the competitiveness of research institutions. Moreover, new forms of public tender financing will be introduced for scientific institutions involved in the implementation of the priority directions of science and technology policy of the Kyrgyz Republic.

For the effective implementation of the state policy in the sphere of science and innovation it has been proposed to **create an independent public Science Development Fund (Fund)**, which will start financing priority areas of research and development on a competitive basis. The Fund will be the organisational structure, serving as the sole holder and manager of budgetary resources devoted to science.
To ensure the efficiency and effectiveness of research funding, resources for scientific and (or) scientific and technical activities from the state budget will be allocated in the following forms:
1) basic funding (for a transitional period of up to 2 years);
2) targeted funding;
3) grant funding.
Basic funding will be allocated for a transitional period to research institutes that will be integrated with universities and separated from the NAS. This type of financing will include the cost of basic needs of scientific research: infrastructure and property, including buildings, equipment and materials, cost of labour and administrative staff.

Targeted funding to implement scientific research will be given in priority areas in accordance with the priorities of the Government Programme and the decisions of the Council for Science and Innovation under the Prime Minister of the Kyrgyz Republic.
Grant funding will be provided in accordance with the research priorities identified by the Council for Science under the Prime Minister of the Kyrgyz Republic, in order to improve scientific research, scientific and technological capacity and competitiveness of scientific organizations and their teams, as well as of scientists.
The reform foresees also to develop common principles of examination of research projects. This approach should create conditions for a mutual recognition of expert opinions for different modes of funding. Duration of financing of projects will be for three and up to five years. Finally a system of preferences is planned for private foundations and individuals, who are funding research.

All these **proposed changes in the funding of science will increase the effectiveness of the science system, if properly implemented**. There is, however, a strong need to further develop the concept and to prepare practical steps. Until now, the limited resources were spread over many institutes and institutions in a traditional mode, without proper scientific assessment and without a focusing on priority areas. There has been a lack of transparency in the allocation of the limited funds. In Kyrgyzstan, there is a **need for a comprehensive scientific assessment of existing scientific activities by independent experts. In the case of a small scientific community like in Kyrgyzstan, this is possible only with the help of foreign experts.** To find suitable foreign scientific experts is a difficult task. It needs qualified human resources to do the work and it involves costs. In addition, language problems may arise. Therefore, the Kyrgyz diaspora and experts currently supporting Kyrgyz development through different international organisations present in Kyrgyzstan could be used. Scientific assessment of existing science is an important task to find out the areas that are currently active and that have potential to develop further. Scientific assessment as a basis for allocating research money is not only a one time task. **Periodic scientific assessment exercises need to be ensured to achieve a certain level of scientific activities and for receiving any kind of governmental support for research.**
A clear distinction between the old system and the new approach for the allocation of money is needed. The **new Fund has to operate independently, transparently using objective scientific assessment/evaluation through foreign experts**. This is valid in case of all forms of scientific funding.

Recommendation 8 – Increase funding for Research and Innovation: For improving the research and innovation performance, as well as the economic perspectives of the country, **it is of utmost importance to increase the GERD as a share of GDP from the current very low levels of only 0.13% (in 2012) GERD as a share of GDP.** The increasing of funding should be **linked to planned reforms such as a competitive distribution of R&I funding**. Increased funding will help the reform to be successful. Furthermore, **all cost of research has to be covered**. It is not possible to perform research when only salaries and social security is covered: increase the salaries, invest in infrastructure and equipment. Check carefully all administrative costs and overheads, and try to make a maximum available directly for research.

Recommendation 9 – Funding against evaluation: The suggested modes of funding basic, programme and competitive/grant are commonly used and may be implemented. **Solid and independent scientific evaluation of project proposals to all the funding modes will be needed.** Foreign experts and the Kyrgyz diaspora should be used for evaluation. Appropriate criteria and procedures to select the most promising projects and competitive research teams will have to be applied, for ensuring trust in the system. **Public R&I funding should be open to all research and innovation players,** including public and private organisations, and different types of organisations including HEI, PROs, BES (Business Enterprise Sector), NPOs (Non-Profit Organisations).

Recommendation 10 – Establish an independent Fund for R&I funding: Establishing a Fund for R&I support is a welcome development in Kyrgyzstan. **One new single Fund for allocating funding for basic and applied research as well as for support of innovation will be sufficient**, given the small size of the research community and of innovation activities.

The review team recommends independent research and innovation funding. While the Fund may be formally under the Ministry of Education and Science (MON), **its independence needs to be ensured**: it should be outside the structure of the Ministry and not directly be managed by it. The head of the Fund should be selected by international peers (e.g. heads of other R&I funds). The personnel should be selected on the basis of qualification. The Fund should possess a **Governing Board involving a broad range of R&I stakeholders** (Line Ministries, NAS-KG, Universities, business sector, and a consistent fraction of foreign experts). It will supervise the Fund's activities, strengthen its independent functioning and can constitute a buffer to harmful external interventions. Furthermore, the Fund must have **full responsibility and autonomy for the allocation of R&I funding**, and for the selection process of project proposals.

Key to success of the new Fund and acceptance of its funding decisions will be a **transparent, objective and fair evaluation procedure**. Transparent meaning that the evaluation criteria and procedures will be made public, and that the evaluation results will be made available to the applicants, including scores and comments of evaluators. Quality control, ex ante and ex post evaluation of research projects has to be done according to international criteria and with the help of international peers.

Recommendation 11 – Take advantage of international donors for supporting R&I: International grants and support from international donors should be used to the maximum possible. Efforts should be made in order to attract additional donors to research and innovation funding and

support. UNESCO, ISTC, UNDP, World Bank, and others may be asked, for example, to support evaluation and assessment, innovation development and other activities.

6 Research personnel

The qualification of and the need for research personnel is of crucial importance for the development of the Kyrgyz S&T sector. However, in Kyrgyzstan human resource policies for research and innovation are facing several challenges. Among them are the shrinking number and the high average age of the R&D personnel, the very low salaries, the limited interconnections between the National Academy of Sciences of the Kyrgyz Republic (NAS KR), other research institutes, the universities and the business sector, and also difficulties with corruption.

The Kyrgyz research personnel amounts to about 5,000, of which 650 are Doctors and 3000 are Candidates. About 1/3 of the researchers are employed at the NAS KR. In 2014 the Attestation Commission appointed degrees to 600 new doctors who successfully mastered the presentation of their thesis. About 90 to 95% of all doctoral theses are being produced in Russian language, the remaining 5 – 10% in Kyrgyz. The number of theses published in English is very low (<1%).

Kyrgyzstan is facing difficulties in attracting the talented youth to a scientific career or retain the competent researchers in research positions. In the last years the research environment has been so unattractive, that many have left research for other sectors and a significant share of researchers has also emigrated. The repercussions on the age structure of the research personnel are important: there is a relatively small group of young scientists aged 35 or below, a significant gap in the age bracket 30-55, and a disproportionally large group of older (55 to 70) and old (above 70 years) scientists. This has also a negative impact on the science produced. The gender ratio among scientist is more or less balanced, with about 52% of the scientists being male. However with increasing degrees, there is a clear disbalance in favour of men. About 57% of the Candidates are men and about 85% of the doctors. The salary level for the research personnel is in general very low. It is fairly difficult to attract the young to research with the current salary levels; monthly salaries reach for young researchers 2500-3000 KGS (€ 40), for researchers about 4000 KGS (€ 60), Institute Director 9300 KGS (€ 140), Vice President NAS KG 12000 (€ 180).

6.1 Assessment

Research and research careers need to be made more attractive. The salary levels need to be increased and funds for equipment and materials be made available. Evaluation of available competence and a refocusing on priority areas and niches of excellence will be needed to that end. Complementary measures should be considered. Popularisation of science (e.g. dissemination, press coverage, through Science Slam events as done in several countries – for example in Moldova) could contribute to raise the prestige and relevance of science and of research careers.

A worrisome trend is the repeatedly described low number of Kyrgyz students who return to Kyrgyzstan after having graduated from foreign universities. This indicates a lack of possibilities for

highly qualified personnel within the Kyrgyz labour market, while at the same time this trend increases the age-gap of the research personnel.

Repeatedly a mismatch between the qualifications of students and the requirements of the Kyrgyz labour market was mentioned. While many students graduate for example as lawyers or economists, there are very few graduates in engineering or geology (particularly striking in a country with an important mining sector). There is an obvious deficit of linkages between the educational and academic system, and the labour market.

One difficulty that is yet to be overcome, is the general lack of an established grading system. This puts enormous pressure on the students, not to fail their single important exam, while at the same time this pressure opens possibilities for corruption, which the Attestation Commission is aware of.

Closer relations between scientific education and scientific research were understood as being one of the crucial issues for reform in the Kyrgyz scientific system. Currently these connections are few, usually based on individual initiatives rather than structural preconditions. The reason for this is the separation between educational (universities) and scientific (NAS KG) responsibilities. An increase of interaction between research institutes and universities is recommended. To this end mutual lectures could be held, the exchange of researchers between institutes and universities could be fostered and common research projects could be launched.

Kyrgyzstan shows great potential for making use of the scientific diaspora, since the country has been experiencing a brain-drain for the past 25 years. The result of this drain is a highly educated group of expat-Kyrgyz. To make maximum use of its scientific diaspora, the research institutes and universities should develop closer relations with former researchers and students. Measures could include establishing permanent networks (e.g. alumni networks), scientific invitations to Kyrgyzstan, scientific conferences with the side effect of the establishment of personal networks between the scientists, brokerage events, joint research projects with scientific partners from various countries. This could yield significant benefits for the further development of both, the Kyrgyz scientific sector and the economic growth of the country. Colleagues of the diaspora should be used for evaluations and be invited to boards (at HEIs, the R&I Fund). In the mid-term the Kyrgyz government could establish grants supporting expat-scientists who return to Kyrgyzstan for a limited timeframe – e.g. in the context of a research programme or project.

Education of researchers is still done according to the Soviet system: Candidat, which can be allocated by NAS KG and HEIs. It is a question currently, whether the Candidat/Dr. Nauk system versus the MA/PhD should be implemented. In this context also the legal recognition of degrees obtained abroad needs to be solved. PhD degrees obtained abroad are usually recognised only as Candidat in Kyrgyzstan, while the colleagues having obtained these foreign PhDs are not willing to get downgraded. Several HEIs are implementing pilots for the Bologna system. Some HEIs have received support through TEMPUS for curricula reform and have established international contacts here. At some point a decision should be taken, which system to follow.

Although significant success has been achieved in fighting corruption since 2011, within the education and research system it is still an important issue. The possibility of achieving higher or

better degrees through payments was mentioned repeatedly. At times certain degrees seem to be available through financial compensation only. The implications of this situation are manifold: the scientific value and reputation of Kyrgyz degrees, universities and scientific work in Kyrgyzstan in general suffers greatly. At the same time the quality of scientific work is diminished, since not the scientific work of a scholar, but the financial support decide on the quality of the degree.

Recommendation 12 – Research careers: Make research careers more attractive, in particular increase the salary levels, and make resources for equipment and materials available. Popularisation of science (e.g. through Science Slam events, press coverage) could contribute to raise the prestige and relevance of science and of research careers.

Recommendation 13 – Scientific diaspora: Use the potential of the Kyrgyz scientific diaspora as far as possible, e.g. for joint research projects with colleagues remaining in Kyrgyzstan, exchanges/mobility, for evaluations in the country (e.g. of project proposals, boards), conferences, for education of young researchers abroad. The scientific diaspora should be researched systematically and a database should be built up.

Recommendation 14 – scientific education and labour market: Address the mismatches in scientific education and labour market requirements. Coordinate and consult with business to identify missing qualifications, and promote these fields of study.

7 Innovation, private sector

The business environment in Kyrgyzstan is not very conducive for innovation activities. In the World Bank's Doing Business ranking, which focuses on the regulatory environment for business activities, Kyrgyzstan is placed at position 102 out of 189 countries ranked in 2015 and has lost three places as compared to 2014.[13] While it is relatively quick and only few procedures are required to start a business, it is particularly complicated to get electricity, to pay taxes, to resolve insolvency and to trade across borders. A broader approach on business issues, beyond regulation, takes the Global Competitiveness report.[14] In this ranking Kyrgyzstan is placed at position 108 out of 144 ranked countries in the edition 2014-2015 (up from place 121 as compared to the previous edition).

[13] See http://www.doingbusiness.org/rankings.
[14] See World Economic Forum (2014), Global Competetiveness Index 2014-2015, http://www.weforum.org/reports/global-competitiveness-report-2014-2015

Problematic factors for business are government instability, corruption, and policy instability (frequent changes in policies).

These data should be considered in comparison to benchmarks such as neighbouring countries and other Former Soviet Union countries. In the Doing Business ranking, Kazakhstan is placed at position 77, Armenia at position 45, and Georgia even at position 15. In the Global Competitiveness report, Kazakhstan is placed at position 50, Armenia at position 85, and Georgia at position 69.

Legal regulation of innovative activities and governance

An appropriate legal regulation of innovation activities is crucial to ensure the development and operation of innovative SMEs. However, regulation needs to be introduced carefully and the trap of over-regulation and bureaucratic hurdles for businesses needs to be avoided. Over recent years various basic elements of a regulatory framework for innovative development have been drafted and adopted:

- Basic law of the Kyrgyz Republic "On innovation activity", of 1999;
- "On protection of the rights of entrepreneurs";
- "On state support of small business";

In addition, a number of strategic documents in the field of innovation were approved:

- National Strategy for the development of intellectual property and innovation in the Kyrgyz Republic for 2012-2016;
- The concept of the state innovation policy of the Kyrgyz Republic for 2003-2005;
- The concept of intellectual property system in Kyrgyzstan;
- State programme for the development of the intellectual property of the Kyrgyz Republic for the period 2000-2010, "Intellect";
- Programme for the development of scientific and technical information in the Kyrgyz Republic for 2004-2010;
- The programme of development of scientific and innovative activity in the Kyrgyz Republic.

The main government body authorised to carry out the implementation of a unified state policy in the field of innovation, is the State Service of Intellectual Property and Innovation under the Government of the Kyrgyz Republic (Kyrgyzpatent). One of the tasks of KyrgyzPatent is the development and promotion of innovation. It was established about 20 years ago. The current form and responsibilities of Kyrgyzpatent were established in 2012, in a reform initiated by the State Council on Innovation under the Government of the Kyrgyz Republic (hereinafter - the State Council), and according to the norms of the Law "On innovation activity". The Council is the coordinating body established to make recommendations and proposals in the field of development of innovative

activity in the Kyrgyz Republic. It is headed by the chairman - First Vice Prime Minister of the Kyrgyz Republic.

In September 2011 a National Strategy for the development of intellectual property and innovation in the Kyrgyz Republic for 2012-2016 was adopted. It was prepared by Kyrgyzpatent. It was designed to create an effective system of intellectual property management and innovation development that can transform research capacity in the country in one of the main resources for sustainable economic growth. Furthermore it should contribute to a technological modernisation of the economy and to improving its competitiveness.

For the implementation of the National Strategy no specific financial resources have been earmarked in the state budget. KyrgyzPatent, as the body responsible for implementation will have to use own resources, and attract donor and partner resources. Support should be provided by international organisations in the form of consultancy, technical and other assistance.

Another strategy document for innovation has been under preparation with the Ministry of Economy in 2015, but it was not yet available for this review.

Innovation activities in the business sector

According to official data of the National Statistics Committee of Kyrgyzstan dynamics of innovation activities are disappointing, showing a noticeable reduction in the number of enterprises producing innovative products, for example from 35 in 2008 to 15 in 2011. However, the indicator increased in 2012 again to reach 27 enterprises generating innovations. This was equivalent to 1.6% of all industry enterprise, which is very low as compared to other countries.

Small and Medium sized Enterprises (SMEs) are important players in innovation. They are perceptive to innovation and dynamism because of their sensitivity to the smallest changes in market conditions and their fast reaction to them. As international experience shows, small innovative enterprises can perform efficient research projects. The SME sector in Kyrgyzstan is composed of about 13,000 companies, whereby most of them are small sized (about 800 companies are medium sized). In addition about 350,000 micro enterprises (individual entrepreneurs) have been operating in the country (excluding farms).[15] Its share in employment and in GDP has been steadily increasing over the last years. In 2014 SMEs employed about 440,000 individuals and contributed nearly 20% of GDP.

What concerns infrastructure for innovation, a virtual Park of High Technologies is operational in the country. Businesses and individuals who are residents of the High-Tech Park enjoy a special, preferential legal and tax regime. It provides relief from taxes and benefits on insurance premiums in accordance with the legislation of the Kyrgyz Republic. The preferences are valid for 15 years, given the activities of the residents contribute to high-tech products.

Most of activities and businesses involved in the High-Tech Park relate to the field of IT (information technologies). For a country with limited natural resources and a certain tradition of a good

[15] Data for 2014. National Statistical Committee of the Kyrgyz Republic. http://www.stat.kg/ru/statistics/maloe-i-srednee-predprinimatelstvo/

education in the sciences such as Kyrgyzstan, developing the IT sector can provide an important push for increasing the share of innovative SMEs in the economy. This follows patterns of other Former Soviet Union (FSU) countries, such as Armenia and Belarus. At the time of the review mission to Kyrgyzstan in April 2015, the High-Tech Park had 7 companies resident, which generated a high-tech production of $ 800,000 per year.[16]

Some dynamism in the IT sector is also demonstrated by the establishment of the Kyrgyz Association of Software and Service (KSSDA), which was established in 2008. It is an association of companies involved in the IT industry. It intends to contribute to a new path of economic development based on innovation, knowledge and creativity, and on the potential of human resources.

7.1 Assessment

Strategy development for innovation has taken place: an Innovation strategy was developed by Kyrgyzpatent, and the Ministry of Economy has been developing an innovation strategy at the time of the mission. How far these processes are interlinked was not clear. A broader sense of innovation, including service innovations, but also organisational or social innovations should be considered here.

The analysis of the qualitative state of the regulatory framework for innovative development and its comparison indicate a lack of methodological approaches that allow a comprehensive integral formation of innovation model of economic growth. Only certain segments of innovative development and a limited number of possible incentives for innovation stimulation have been considered. The legislation and regulations are mainly a framework, establishing the most common principles, objectives and tasks of innovative development, without determining specific mechanisms and levers for implementation.

The impact of the legislative acts, which were developed and adopted in the sphere of innovation were largely offset by the following deficiencies: underdevelopment of market relations, a low degree of maturity of the competitive environment, undue bureaucratization of the executive power, limited financial resources necessary to create favorable conditions for the functioning of innovative SMEs, low involvement in international R&I cooperation, the lack of appropriate infrastructure, low level of innovation culture and the inertia of economic thinking.

The contribution of SMEs to innovation, including research, high-tech production, services and social innovations in Kyrgyzstan is not researched and data are missing. But it is supposed to be still insignificant. Small and medium-sized enterprises are not well integrated into the innovation system. The links and cooperation network among "Science and Education - Innovative SMEs - Big business" are underdeveloped. Moreover, the research sector is only to a limited extent focused on the know-how required by business. This situation prevents the spread of knowledge of the research and development sector to business.

Innovation issues have up to now had only a low consideration in Kyrgyzstan, and very few innovation stimulation instruments (e.g the virtual high tech park) and limited stimulation efforts

[16] See: http://it-park.kg/

have taken place so far. Collaborative grants for research-business cooperation, even if small scale in terms of funding, have proved instrumental here. Innovative ideas developing in research institutes and universities should be nurtured and spin offs be facilitated. The legal framework should not put any barriers to such business development, but stimulate it. Other measures such as business contests and brokerage events should be considered. It will be useful in this context to study international experience in innovation stimulation, in particular of other FSU countries. This can show what works well in a similar environment. Examples to be studied could include Georgia (GITA[17]; e.g. support for IT sector), Kazakhstan (NATD[18]), Moldova (ODIMM[19]; e.g. programme to attract financing from migrants for establishing SMEs in Moldova), Russia (e.g. FASIE[20], e.g. support for young innovators – UMNIK programme).

Some encouraging developments could be observed: a virtual technopark has been established for stimulating innovative businesses. It is used mainly by the IT sector, which shows some encouraging development as an innovative niche (as in other FSU countries, e.g. Armenia, Ukraine, Belarus). For using the full potential of the IT sector, in particular IT outsourcing and development of IT products in the Kyrgyz Republic, several issues have to be considered. To date, the main problem is the shortage of skilled professionals, as well as the absence of major customers in the IT outsourcing market of Kyrgyzstan. Poor knowledge of English language among developers needs to be tackled. For the development of IT products a set of issues should be tackled, including establishing a critical mass of ideas and startups, of business angels and venture capitalists, availability of equity markets and shareholders on the internal market.

Measuring of innovation and of business R&D activities is done only to a very limited extent by the Kyrgyz statistical office. This should be improved, to get a better picture of the situation in the business sector, and for international comparison. It would be important to identify companies in Kyrgyzstan, where some innovation is taking place. Mining companies are mainly foreign owned (e.g. Canada, China). According to information gathered in interviews they nearly don't make use of the local research capacities, which is a pity. A positive example is here the investment of the Russian Gazprom, which allowed the ENERGIA institute to hire young research staff. Interviewees also suggested that there should be some potential among Kyrgyz business for funding of research and innovation activities. It will be important to attract such resources and to establish attractive framework conditions for R&I investments.

Innovation should also be integrated in education. The level of innovation education can be increased through curriculum renewal, e.g. through introducing innovation management in curricula, and through training and retraining in the field of innovation activities.

Recommendation 15 – Support innovation policy at the governmental level: At the state level it is necessary to provide **more support for the development of national innovation policies, to improve**

[17] http://gita.gov.ge/en/
[18] http://natd.gov.kz/ru/
[19] http://www.odimm.md/
[20] http://www.fasie.ru/

coordination between the institutions, strategic documents, administrative and financial instruments which have an impact on the innovation system. The current legislation relevant for innovation needs to be reviewed with a focus on providing a stimulating and non-bureaucratic environment for innovation activities (e.g. the law "On innovation activity"). Customs duties on imported specialized scientific equipment, which have no domestic analogues, should be removed.

Recommendation 16 – Innovation stimulation and research-business cooperation: Consider introducing suitable innovation stimulation instruments. **Collaborative grants are recommended for stimulating cooperation among research and business actors.** Other measures could include business contests, round tables, and brokerage events. **Study the international experience in innovation support,** in particular in other countries of the Former Soviet Union, to find suitable instruments for the country. **Attract extra-budgetary sources** - private investors, strategic partners and equity businesses for financing innovation activities, possibly in co-funding modes with public support.

Recommendation 17 – Enabling environment, education, priorities: Establish an enabling environment for innovative SMEs and for stimulating innovation development. Avoid or **remove any barriers to the creation of innovative businesses and of spin-offs from research institutes and universities, and stimulate such activities**. Identify **fields of innovation potential beyond the IT sector**, e.g. renewable energies and energy efficiency. Consider integrating innovation in education, e.g. in university curricula.

8 Annex

8.1 Practical recommendations for developing the IT sector

The IT sector serves as a good practice case, but other sectors need to be considered as well. Emphasis needs to be put on developing IT products rather than on IT outsourcing. Accordingly, the following practical measures could contribute to this development:

- A critical mass of start-ups should be created by holding Hackathons (developer forums), regular events and competitions of ideas, adopt good practice from abroad (e.g. Startup Chile: namely, foreign fund startups to share experiences).

- Consider the possibility of acceleration of programmes and the creation of full-fledged business incubators

- Involve business angels in the ICT industry, no less important aspect is the training of potential business angels among wealthy citizens

- To attract foreign venture capital

- Open a large coworking space

- Access to IPO, selling to a strategic buyer

- Open Innovation Centres of multinational IT companies (e.g. Microsoft, CISCO, etc.)

- Invite the international investors to Demo Days

- Raise awareness «Kyrgyzstartup»

In view of the lack of development of the republic in the innovative SMEs focus should be on the IT technology and the development of start-ups for SMEs. There are also many events, competitions and communities that could contribute to raising the level of entrepreneurial potential, for example:

• Global Entrepreneurship Week - a one-week event held in November, aimed to help people assess their potential as innovators and entrepreneurs;

• Startup Weekend: 54-hour- Hackathon, in which the participants generate ideas and represent investors to assess;

• Entrepreneurship Simulation: The Startup Game Game simulations in startups: teamwork, conflict, negotiation with partners;

• The Venture Capital Game: simulation of a situation where employers are trying to get the highest valuation of the company

• Google Launchpad - an event that provides the necessary technology and expertise to run and scale your application

• Legal Startup - legal seminars on problems and challenges of investing in venture capital firms;

• Startup experience - 2-day intensive workshop for students to prepare for the entrepreneurial path

• Code zhazgan Kyrgyzstan - a six-week TV show, in which representatives from different groups are taught programming from scratch;

• Hour of Code - a one-hour introduction to computer science to show that anyone can learn the basics of programming. To attract well-known stars, public figures, professionals in the run-up set at the university;

• Startup Grind - a global startup community created to educate, inspire and connect entrepreneurs. Monthly events are invited successful investors, startups and entrepreneurs;

• Code for KG (Code for America brigade) - the movement aimed at the use of open source solutions to make government services easier, more efficient and easier to use.

• Google Business Groups - community business professionals to share experiences with Google tools for business;

• Google Developers Groups - community for developers interested in technology development Google, on the platform Android, Chrome, Drive, and Google Cloud API to food such as Cast API, Maps API, and Youtube API;

• Code.Org: website aimed at attracting the interest of young people in computer science.

8.2 Areas of the PMPR Kyrgyzstan

In the kick-off meeting of the PMPR Kyrgyzstan (Athens, Jan. 2015), the following areas have been highlighted as important for the review:

Strategy

- Strategy – Conception for reform of the science organisation of Kyrgyz Republic
- Role of National Academy of Sciences (NAS), Universities, private sector
- Research Priorities are not defined properly in KG
- All different actors are implementing different ways of research, but it is not coordinated. NAS, branch institutes under Ministries (e.g. Ministry of Health), universities (to a lesser extent)
- Research: Responsibilities are split among the different players, duplication of efforts. NAS is responsible for NAS, Ministry of Education and Science (MON) for branch institutes and HEI
- Statistics: availability of R&D and innovation statistics

Public Research Organisations

- Role of the National Academy of Sciences versus the universities. What is the role of the NAS and its tasks, in the light of the reforms envisaged?

Higher Education Institutions (HEI) - Universities

- Universities are still caring mainly for education, and are not enough linked to research. There seems to be a certain mentality problem at HEI.
- Is the overload with teaching obligations restricting the possibilities for research? Do the universities have to generate income through tuition fees?
- Role and potential of Private Universities

Financing of research

- What is the investment in R&D, GERD, etc.
- NAS is financed directly from the budget, branch institutes are financed from Ministry of Education and Science

Research personnel

- Education of researchers: at which institutions are researchers educated, is this education well organised and adequate?
- Age structure of researchers
- Role of the scientific diaspora

Implementation of research results

- Where are research results implemented, if at all? Is there some implementation of research results in the private sector?
- In general the local stakeholders have the impression that research results are only to a very limited extent implemented: some rare examples of such implementation exist (e.g. boiler)
- Research and innovation should be linked under one roof, e.g. under Kyrgyzpatent (for the moment only working on IPR), also for support of innovation

Private sector

- Is there a research in the business sector? – possibly in some of the more important sectors of the economy, such as in the mining sector, in services, and agriculture.
- Is the business so far developed to invest in research?

8.3 Organisations visited

- Department of the presidential office, responsible for science (and education), http://www.president.kg/

- Governmental office under Prime Minister responsible for science, http://www.gov.kg/?p=5393
- Vice Speaker of Parliament, Committee for Science, http://www.kenesh.kg/ru/
- Ministry of Education and Science (MON), http://edu.gov.kg/
- Ministry of Finance (MINFIN), http://www.minfin.kg/ru/
- Ministry of Economy: Mineconom & fund for development of innovation (under Mineconom), http://mineconom.gov.kg/index.php?lang=en&Itemid=133
- Ministry of Health, http://www.med.kg/
- Ministry of Agriculture, http://www.agroprod.kg/
- Ministry of Energy
- Parliament – committee for education and science
- NISI – national institute of strategic research (under president), http://www.nisi.kg/
- Expert council - members
- National Academy of Sciences of the Kyrgyz Republic (NAS KG), http://www.nas.aknet.kg/eng/index.php?menu=0
- Branch institutes – ENERGIA in the energy field
- Kyrgyzpatent: patenting, intellectual property, on private innovations not working; http://patent.kg/index.php/ru/
- Statkomitet – Statistics Committee
- VAK – Higher Attestation Commission
- National university http://www.university.kg/,
- Kyrgyz State Technical University http://kstu.kg/en
- Osh State University http://www.oshsu.kg/univer/?lg=1&id_parent=1
- Aga Khan University (University of Central Asia) http://www.ucentralasia.org/,
- American University, https://www.auca.kg/
- Kyrgyz-Russian (Slavic) University http://www.krsu.edu.kg/index.php?lang=en
- Association of Rectors
- Chamber of Commerce
- Association of Entrepreneurs, http://spk.kg/
- Companies which perform research, or have a research institute/department linked to it
- EU representation, http://eeas.europa.eu/delegations/kyrgyzstan/index_en.htm
- UNDP
- World Bank
- NCP for H2020
- Free Economic Zone
- Regional centres – Issyk-Kul University, Osh, Jalalabad
- Russian-Kyrgyz Fond for Development
- ISTC

8.4 Agenda of Visits

30 March 2015, Monday		
Time	**Meeting**	**Venue**
9.30	Departure from the hotel	
10.00 – 11.45	**Gulmira Kudaiberdieva** Head of the Department for Social Policy, Office of the President of the Kyrgyz Republic **Members of the Working group of Expert Council for reform of science system of KR** Zamira Derbisheva **Coordinator of the Expert Council** Chinara Adamkulova **Expert** Svetlana Sirmbard **Expert**	White House, Chui ave., 205, Bishkek
12.00 – 13.30	Lunch	
13.40 – 14.40	**Abdyrahman Mavlyanov** Chairman of the Higher Attestation Commission of the KR	Higher Attestation Commission of the Kyrgyz Republic, Erkindik ave., 2, Bishkek
15.00 – 16.15	**Zina Isabaeva** Deputy Chairman of the State Service for Intellectual Property and Innovation under the Government of the Kyrgyz Republic	State Service for Intellectual Property and Innovation under the Government of the Kyrgyz Republic, Moskovskaya st., 62, Bishkek
16.30 – 17.15	**Alexander Avanessov** UNDP Resident Representative in Kyrgyzstan	House of UN Bishkek, Chui ave., 160,

31 March 2015, Tuesday

Time	**Meeting**	**Venue**
8.45	Departure from the hotel	
9.00 – 10.30	**Kabyrbek Sakiev** Director of the Institute of Geology named after M. Adyshev **Bekmamat Djembaev** Director of the Institute of Biology and Soil of NAS KR **Kubanychbek Jumaliev** Director of the Institute of Physical and Technical Problems and Materials Science of NAS KR **Asankadyr Junushov** Director of the Institute of biotechnology of NAS KR **Bakytbek Sultanaliev** Director of Technopark of NAS KR	National Academy of Sciences of the KR, Chui ave., 265a, Bishkek
11.00 – 11.45	**Aidai Kurmanova** State Secretary of the Ministry of Economy of the KR	Ministry of Economy of the KR, Chui ave., 106, Bishkek
12.00 – 12.45	**Duishen Mamatkanov** Director of the Institute of Water Problems and Hydropower of NAS KR	Institute of Water Problems and Hydropower of NAS KR, Frunze st., 533, Bishkek
12.45 – 13.45	**Lunch**	
14.00 – 14.45	**Abdygany Erkebaev** President of National Academy of Sciences of the KR and Vice-presidents of National Academy of Sciences of the KR	National Academy of Sciences of the KR, Chui ave., 265a, Bishkek
15.00 – 15.45	**Esen Djumanov** Executive director of NGO Bishkek Business Club	Chui ave., 245/1, Bishkek Tel: +996 312 89-86-80 Web: http://www.bdk.kg/ E-mail: office@bdk.kg
16.00 – 17.00	**Vitalii Kovalenko** Head of Regional Unit of International Scientific and Technical Centre in	International Scientific and Technical Centre in Kyrgyzstan,

	Kyrgyzstan	Kievskaya st., 44, Bishkek
17:30 – 18.30	**Taalaibek Aidaraliev** Minister of Agriculture and Land Reclamation of the KR	Ministry of Agriculture and Land Reclamation of the KR, Kievskaya st., 96a, Bishkek
18.30 – 19.30	**Talantbek Batyraliev** Minister of Health of the KR	Ministry of Health of the KR, Moskovskaya st., 148, Bishkek

1 April 2015, Wednesday		
Time	**Meeting**	**Venue**
8.45	Departure from the hotel	
9.00 – 10.15	**Johannes Stenbaek Madsen** Head of Operations Section of the Delegation of the European Union to the Kyrgyz Republic	Delegation of the European Union to the Kyrgyz Republic Business center “Orion”, Erkindik ave., 21, Bishkek
10:30 – 11.15	**Elvira Sarieva** Minister of Education and Science of the KR	Ministry of Education and Science of the KR, Tynystanov st., 257, Bishkek
11.15 – 12.45	**Meeting with rectors and vice-rectors of universities of Kyrgyzstan**	Ministry of Education and Science of the KR, Tynystanov st., 257, Bishkek
13.00 – 13.45	**Lunch**	
14.00 – 14.45	**Akylbek Osmonaliev** Chairman of National Statistical Committee of the KR	National Statistical Committee of the KR, Frunze st., 374, Bishkek
15.00 – 15.45	**Talant Sultanov** Director of the National Institute for	National Institute for Strategic Studies of the

	Strategic Studies of the KR **Chynara Esengul** Deputy director	Kyrgyz Republic, Kievskaya st., 218, Bishkek
16.00 – 16.45	**Askar Kutanov** Regional Coordinator for EC Central Asian Research and Education Network (CAREN) Project **Elnura Korchueva** Executive Secretary of the National Commission of the Kyrgyz Republic for UNESCO	National Academy of Sciences, Chui ave., 265a, Bishkek
17.00 – 17.45	**Almaz Aldashev** Director of the Institute of Molecular Biology and Medicine at the National Center of Cardiology and Therapy	the Institute of Molecular Biology and Medicine at the National Center of Cardiology and Therapy
18.00 – 18.45	**Rysbek Satylkanov** Chairman of Association "Renewable Energy of the Kyrgyz Republic" **Almaz Asipjanov** Chairman of NGO "EnConsult"	Association "Renewable Energy of the Kyrgyz Republic" Frunze st., 533, Bishkek

2 April 2015, Thursday		
Time	**Meeting**	**Venue**
8.45	Departure from the hotel	
9.00 – 9.45	**Nurzat Abdyrasulova** Director of Public Foundation “Unison”	Public Foundation “Unison”, Abdymomunova st., 145, Bishkek
10.00 – 10.45	**Bogdan Kravchenko** General Director of the University of Central Asia	University of Central Asia, Toktogul st., 138, Bishkek

11.00 - 11.45	**Jean-Michel Happi** World Bank Country Manager for the Kyrgyz Republic	World Bank Office, Moskovskaya st., 214, Bishkek
12.00 – 13.00	**Bodosh Mamyrova** Vice – speaker of the Parliament of the KR **Kanybek Osmonaliev** Head of the Committee on Education and Science of the Parliament of the KR	Parliament of the KR, Chui ave., 205, Bishkek
13.00 – 13.45	**Lunch**	
14.00 – 14.45	**Andrew Wachtel** President of the American University of Central Asia	American University of Central Asia, Abdymomunov st., 205, Bishkek
15.00 – 15.40	**Abdimannap Muratov,** Head of Department of Education, Science, Culture and Sports of the Government of the Kyrgyz Republic	House of Government
16.00 – 16.40	**Batyrkul Baetov** State Secretary of the Ministry of Energy and Industry of the KR	Ministry of Energy and Industry of the KR, Ahunbaev st., 119, Bishkek
17.00	**Orozbek Nusuvaliev** General Director of Free Economic Zone "Bishkek"	Free Economic Zone "Bishkek", Mir ave., 303, Bishkek
19.30	Official dinner on behalf of the Government of the Kyrgyz Republic with participation of **Damira Niyazalieva** Vice Prime Minister of the Kyrgyz Republic	The ethno-complex "Supara", Karagul Akmata Str., 1a, Kok-Jar village

3 April 2015, Friday		
Time	**Meeting**	**Venue**
9.45	Departure from the hotel	
10.00	**Round table**	National Library of the Kyrgyz Republic,

	Bodosh Mamyrova Vice – speaker of the Parliament of the Kyrgyz Republic **Gulmira Kudaiberdieva** Head of the Department for Social Policy, Office of the President of the Kyrgyz Republic **Abdamannap Muratov** Head of Department of Education, Science, Culture and Sports of the Government of the Kyrgyz Republic **Kanybek Osmonaliev** Chairman of the Committee on Education and Science of the Parliament of the KR	Abdrahmanov st., 208, Bishkek

8.5 Material

- **Country Reports on S&T system**, as published at INCREAST website: http://www.increast.eu/en/102.php
- UNESCO Institute for Statistics **(UIS):** http://www.uis.unesco.org/Pages/default.aspx
- **World Bank**: http://www.worldbank.org/
- **Other International Sources:** UNDP, UNESCO Science Report (http://www.unesco.org/new/en/natural-sciences/science-technology/prospective-studies/unesco-science-report/)
- **Power Point Presentations** kick-off, Athens 23 January 2015
- **National Sources:** Annual Reports of Academies of Sciences, Reports of Ministries on S&T Issues, Reports of Universities, National Statistics Agencies, Innovation Agencies, Reports of non-governmental research organisations, etc.
- **Concept on the reform of the organisation of science in the Kyrgyz Republic**: http://www.gov.kg/?p=48182
- **Documents of Reform Commissions and Working Groups for the science sector;**:
  - Commission of national experts for the reform of the science sector.
  - national council, headed by the President of Kyrgyzstan;
  - president council of society,
  - working group on the reform of science
- **EU information on cooperation with Kyrgyzstan**: https://ec.europa.eu/europeaid/countries/kyrgyzstan_en
- **UNDP in Kyrgyzstan:** http://www.kg.undp.org/content/kyrgyzstan/en/home/ourwork/overview.html
- http://www.eucentralasia.eu/home.html
- Bertelsmann foundation
- NATO Science for Peace programme: http://www.nato.int/cps/en/natohq/topics_85373.htm

8.6 Kyrgyz mass media about the site visit for PMPR in Bishkek, 30 March – 3 April 2015

1. ***ca-news.org/news:1145476***

2. minculture.gov.kg/ru/informatie/

С 30 марта по 3 апреля начался визит в Кыргызстан международных экспертов ЕС из Австрии, Германии, Греции, Эстонии и Казахстана. Данный визит ...

3.. nlkr.gov.kg/index.php?option=com_content...

8 ч. назад ... С 30 марта по 3 апреля начался визит в Кыргызстан международных экспертов ЕС из Австрии, Германии, Греции, Эстонии и ...

4. kg.akipress.org/news:613031

2 дн. назад **... Академия наук рассказала европейской делегации** об **открытиях** кыргызстанских ... эксперты из Австрии, Германии, Греции, Эстонии и **Казахстана**. ... НАН **рассказали** об **открытиях**, сделанных **учеными** академии, ...

5. novosti.izde.kg/search/академия

Академия наук рассказала европейской делегации об открытиях ... Вице-президенты НАН рассказали об открытиях, сделанных учеными академии, о проблемах и .... Казахстан упразднил свою АН, а теперь не может воссоздать

6. zdorovie.akipress.org/news:19866/

22 ч. назад ... Международные эксперты ЕС 31 марта посетили Министерство здравоохранения КР, где встретились с министром здравоохранения ...

7. kg.akipress.org/news:613020

день назад ... международные отношения ... правительстве Кыргызстана 30 марта состоялась встреча с экспертами в области науки стран Европы.

1 день назад ... Министр образования Э.Сариева обсудила с европейской делегацией вопросы научно-исследовательской системы Кыргызстана.

8. *tazabek.kg/news:388516*

1 день назад ... 16:40, 01-04-2015 Министр образования Э.Сариева обсудила с европейской делегацией вопросы научно-исследовательской системы Кыргызстана .... Министерство юстиции предложило внести изменения и дополнения в порядок ведения единого государственного реестра юридических ..

9. patent.kg/index.php/ru/

В Кыргызпатенте состоялась встреча с международными экспертами в ... (Кыргызпатент) состоялась встреча с экспертами в области науки стран ...

10. www.kabar.kg/pressreliz/full/91617

6 ч. назад ... Министр сельского хозяйства и мелиорации Кыргызской Республики Таалайбек Айдаралиев встретился с Европейской делегацией во ...

11. novosti.izde.kg/content/64670

6 ч. назад ... ... с Европейской делегацией. Министр сельского хозяйства и мелиорации Кыргызской Республики Таалайбек Айдаралиев встретился с .

12. www.kabar.kg/rus/society/full/91588

Международные эксперты и представители НАН КР обсудили состояние научно-исследовательской системы в КР Бишкек, 1 апреля /Кабар/. Международные эксперты и представители Национальной акад

13. ca-news.org/news:1145597

2 ч. назад ... CA-NEWS (KG) - В Национальной библиотеке КР 3 апреля состоится круглый стол с участием международных экспертов Европейского

14. kg.akipress.org/news:613150

2 ч. назад ... Бишкек (АКИpress) - В Национальной библиотеке КР 3 апреля состоится круглый стол с участием международных экспертов .

15.www.vb.kg/.../308750_s_delegaciey_evrosouza_obsydiat_naychno_issledovatelskyu_sistemy_kyrgyzstana.html

12 мин. назад ... Завтра, 3 апреля, в Национальной библиотеке КР состоится круглый стол с участием международных экспертов Европейского союза.

16. www.kenesh.kg/RU/Pages/ViewNews.aspx?id=8...

02.04.2015 17:36. Депутаты Жогорку Кенеша встретились с экспертами Евросоюза. Сегодня, 2 апреля группа депутатов во главе с заместителем Торага ...

17. ca-news.org/news:1145644

3 ч. назад ... CA-NEWS (KG) - Эксперты Европейского Союза посоветовали привлекать в образование и науку Кыргызстана зарубежных исследователей и кыргызстанцев, работающих за рубежом. ... работающих за рубежом, чтобы образование и наука были транспарентны и объективны. [версия для ...

18. http://www.nisi.kg/ru-events-1201

В НИСИ КР состоялась встреча с членами Европейской делегации, посетившей Кыргызстан с целью изучения и анализа национальной научно-исследовательской системы и намеченных реформ в Кыргызстане. В составе делегации международные эксперты из Австрии, Германии, Греции, Эстонии и Казахстана. В Кыргызской Республике ими был проведен анализ общей ситуации в системе науки, научных институтов при ВУЗах.

8.7 Agenda of PMPR report presentation in Bishkek, 8 September 2016

Report S&T Policy Mix Peer Review (PMPR) in Kyrgyz Republic

Agenda
of the PMPR Report presentation

8 September 2016

Venue: Ministry of Education and Science of the Kyrgyz Republic
Address: 257 Tynystanov street, Bishkek

9.00 – 9.30	**Registration**
9.30	**Opening of the meeting**
	Abdimannap Muratov – *Deputy Minister of Education and Science, Director of the National Science Fund of the Kyrgyz Republic*
9.30 – 10.00	**Welcoming speech**
	Gulmira Kudaiberdieva – *Deputy Prime Minister of the KR*
	Sadyk Sher-Niyaz – *Chairman of the Committee on Social Affairs, Education, Science, Culture and Public Health of the Parliament of the KR*
	Elvira Sarieva – *Minister of Education and Science of the KR*
10.00 – 10.45	**Presentation of the report and recommendations**
Moderator	Jyldyz Bakashova – *National Coordinator of Horizon 2020, Director of the National Library of the Kyrgyz Republic*
	Manfred Spiesberger – *Team leader; Senior Scientist, Centre for Social Innovation (ZSI), Austria* Hendrik Meurs – *Team member; Scientific Officer, International Bureau of BMBF at DLR (IB-DLR), Germany* Zhumatay Salimov – *Team member; Deputy Chairman, National Agency for Technological Development (NATD), Kazakhstan*
10.45 – 12.00	**Questions and discussion**
12.00	**Closing of the meeting**