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Innovation for Sustainable Development Review of Kyrgyzstan – Preliminary FindingsConference room paper submitted by the secretariat**Summary**

The objective of this paper is to report on the status of the Innovation for Sustainable Development Review of Kyrgyzstan, and presents some preliminary findings and policy recommendations.

Background

1. UNECE began a programme of Innovation Performance Reviews in 2010. Belarus, Kazakhstan, Ukraine, Armenia and Tajikistan undertook such reviews, released as official UN publications. These reviews are country-led participatory policy advisory activities, in which a team of international experts assess the country's national innovation system, its policies and performance against international good practice and makes policy recommendations for further improvements on this basis. Following an international peer review and the publication of the final review, UNECE works with the country to provide policy advice and capacity building to facilitate the implementation of selected policy recommendations.
2. In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, which puts an emphasis on innovation as a goal in itself and as a tool for facilitating the achievement of many of the other goals contained in the agenda. The 2030 Agenda also creates a new emphasis on follow-up and review to monitor and facilitate progress with implementation. This follow-up and review process is envisaged to have a regional dimension, and it is to build on existing activities in order to avoid creating excessive new reporting requirements for countries. Therefore, UNECE reoriented its national innovation performance reviews as Innovation for Sustainable Development Reviews by adding a focus on the role which innovation policy can play in advancing national sustainable development priorities. Belarus was the first country to pilot this new approach, with the Innovation for Sustainable Development Review of Belarus currently being finalized as an official UN publication.
3. The delegation of the Kyrgyz Republic expressed their interest to be the second country to receive an Innovation for Sustainable Development Review at the tenth session on the UNECE Committee on Innovation, Competitiveness and Public-private Partnerships held in Geneva 23-25 May 2016.

Status of the Project

4. The preparatory and fact finding missions for the project have taken place in close cooperation with the national project focal point, the State Service of Intellectual Property and Innovation under the Government of the Kyrgyz Republic (henceforth, “Kyrgyzpatent”). The UNECE secretariat expresses its appreciation for the excellent cooperation during the project. This has included a preliminary mission to the country by UNECE secretariat in December 2016, followed by a fact-finding mission with a team of international experts in April 2017. Initial findings and policy recommendations were peer reviewed at the ninth session of the SPECA Working Group on Knowledge-based Development in Bishkek in June 2017. The Review is currently being finalized and will subsequently be launched in the country.

Some Preliminary Findings

5. Kyrgyzstan is in the process of aligning its national development strategies with the UN 2030 Agenda for Sustainable Development. The Government has recognized innovation and knowledge-based development as policy priorities and has recently adopted a series of new legal documents in this area. Considerable efforts are also being made to develop statistical indicators and to collect the corresponding data as a basis for evidence-based policymaking, monitoring and review. Still, the National Innovation System as a whole is at an early stage of development. The Innovation for Sustainable Development Review assesses the current state of the system, its governance, institutions, policies, and performance against international good practices and provides recommendations to the Government on how to further improve its innovation policies with a view to contributing to the country's sustainable development priorities.
6. There are national specificities that innovation policies must reflect in order to build an effective national innovation system. In the case of Kyrgyzstan, this context includes being a small and relatively open economy that is in rapid transition. This increases the importance of international linkages and collaboration, as well as readiness to absorb and apply knowledge developed abroad.
7. While very high transport costs are a challenge for imports and exports, this also increases the payoff from economic specialization in higher value outputs that are less cost sensitive. Membership of the Eurasian Economic Union, building on long-standing linkages with CIS countries and a position on historical trading routes and the One Belt One Road initiative all present opportunities for specialization within international value chains. While integration into international value chains is at present marginal, limited but increasing FDI suggests some positive development. Nonetheless, a poor business environment is significantly hampering private sector development, in particular SMEs. Improving the business environment should be a policy priority because new enterprises have a critical role to play in driving innovation. Infrastructure, in particular transport, energy and communications, remains one of the most significant economic challenges, both for enterprise development in general, and for the participation of Kyrgyz firms in international value chains. Adoption of international quality standards would also improve export competitiveness.
8. Expenditure on R&D, at around 0.1% of GDP, remains so marginal that a range of complementary policy tools will be needed to improve innovation performance in a way that has a significant positive impact on the national economy. While there are islands of excellence in terms of individual private enterprises that have innovated successfully, skills and capacity constraints mean that there is often limited integration with and investment in local supply chains. Public support to such companies' innovation activities should be strengthened. In order to ensure that such support adequately addresses actual needs, the business sector should be involved in the formulation of innovation and science and technology policy, e.g. through foresight exercises. Until now, the main channel of economic modernization and technological upgrading has been the private sector adopting and adapting

knowledge, most notably through imports of embodied knowledge in machinery and equipment and through software development. Increasingly, there will be a need to move to higher-level models of knowledge-based development, including increased private sector intramural R&D and collaboration with academia. In this regard, policy support could be focused on sectors where some comparative advantage already exists and where there is significant potential for integrating into regional and global value chains, including textiles, food processing, agricultural technologies or tourism. Public procurement could play a significant role in generating additional demand for locally developed innovations, for example in the ICT sector.

9. At the level of the National Innovation System, there should be measures not just to establish missing components, but also to establish missing connections and improve coordination, which are equally crucial for system level outcomes and do not always require significant financial investment.
10. In the research and scientific sectors, while there is a need to consolidate fragmented capacities, drastic reforms could result in further loss of capability. What is needed is increased investment from current very low levels of R&D, together with thorough consultation on what constitutes “critical mass” in specific research fields, and how best to achieve this in each field through gradualist reform with frequent progress checks. Legal barriers to commercialization of academic results are currently being addressed, but there is also a need to build skills and capabilities. While there have been high levels of investment in education, this is in the context of very strong demands from a young and growing population, and there must now be measures to both improve quality and boost international linkages in the sector.
11. In terms of the financing of innovation at the enterprise level, on the one hand, some surveys suggest that financing is not currently among the major constraints of enterprises, in part due to Kyrgyzstan’s relatively well developed microfinance sector. On the other hand, developing financing mechanisms and intermediaries tailored to the specific needs of new firms at the early stage of the innovation cycle, such as business angels and venture capital, requires time and therefore should receive policy support so that adequate financing will be available as other obstacles to innovative entrepreneurship are being removed and the number of new innovative companies in need of financing increases. This is an area where commercial banks are not well equipped to operate effectively due to high levels of risk, as well as the need for a proactive investment management approach.
12. Draft policy recommendations are included in the Annex to this document.

Annex

Draft policy recommendations of the Innovation for Sustainable Development Review of Kyrgyzstan

Chapter 2. Governance of the national innovation system: Framework conditions, innovation policies and instruments

Recommendation 2.1

Develop an Action Plan to strengthen the innovation infrastructure and innovation support institutions:

- Carry out a needs assessment of innovation intermediaries and support institutions and develop a programme for setting up the necessary institutions; seek to engage donor support to accelerate this process;
- Design programmes of technical assistance (including to facilitate access to finance) to innovative entrepreneurs, SMEs and grassroots innovative initiatives implemented by public innovation intermediaries and support institutions;
- Consider establishing an experimental technology transfer centre, possibly jointly between a number of higher education/research institutions, as a public-private partnership with industry participation to facilitate technological upgrading projects in industry;
- Set up a special programme to support private innovative entrepreneurship at universities and facilitate university start-ups and spinoffs;
- Institute regular competitive grant financing to support innovative start-ups and ventures; consider measures of public support to private business angels and/or venture capital firms.

Recommendation 2.2

Initiate policy measures to improve connectivity and linkages in the national innovation system through appropriate policy instruments:

- Introduce grant project funding allocated through competitive open calls to support innovation and technology upgrading projects; such funding should cover the full innovation cycle, from R&D to developing new products and bringing them to the market;
- To improve connectivity and linkages, innovation project funding could be made conditional on the establishment, at the project planning stage, of collaborative linkages among innovation stakeholders, in particular between R&D and industry;
- Discuss with other members of the Eurasian Economic Union the introduction of similar joint instruments aimed at supporting cross-border innovation projects engaging partners from several countries;
- Complement these measures with non-financial coordination instruments to support connectivity (facilitating networking and information sharing among potential stakeholders; organising forums, exhibitions, fairs, etc.) which facilitate inter-firm linkages and linkages between industry and R&D institutions;
- Ensure the selection criteria applied by the above policy instruments match national strategic priorities and policy objectives.

Recommendation 2.3

Develop new policy instruments aligned with and supporting the policy orientation towards industrial modernisation through technology transfer:

- Introduce incentives for the business sector (such as tax and tariff relief, access to subsidized credit, government guarantees, etc.) specifically targeting the technological upgrading of production facilities and the acquisition of technological equipment as well as the establishment of virtuous supply-demand feedbacks, client-supplier interactions and clusters;

- Design and introduce mechanisms facilitating cost and risk sharing among business partners as well as public-private partnerships in implementing modernisation projects; engage collective technology transfer centres in this process;
- Discuss with the Russian-Kyrgyz Development Fund the development of a special programme for industrial modernisation whereby the government would commit to provide additional incentives for projects that target national priority areas.

Recommendation 2.4

Consider measures for improving the governance of the NIS:

- Undertake a critical review of NIS governance and define clearly the functional responsibilities of all public bodies tasked with innovation policy design and implementation;
- As part of this process, define a clear mandate of the Council on Innovation/Council on Science and Innovation as the highest decision making public body tasked with innovation management and policy coordination and the steering of national innovative development;
- The Council on Innovation/Council on Science and Innovation should become an operational body which holds regular sessions to implement a work plan approved by the government;
- All line bodies tasked with innovation management would report to the Council on their activities; where needed, the Council will coordinate policy implementation among line bodies;
- If Kyrgyzpatent is to remain the main line body tasked with innovation management, it should also be assigned with responsibilities and autonomous decision-making power to manage new innovation policy instruments to be introduced as per recommendation 2.2;
- All other line bodies responsible for innovation management should also be equipped with policy instruments under their control that match their responsibilities;
- All public NIS bodies need to be staffed and resourced adequately in order to be able to perform their functions; the authorities may consider a special capacity-building programme to this effect.

Recommendation 2.5

Develop a special plan for undertaking the planned reform of the science system in Kyrgyzstan, based on a gradualist approach:

- Consult all key stakeholders involved (in particular MES and NAS) on the scale and scope of the reforms, their sequencing and speed of implementation with a view to finding consensual solutions;
- Stage the reforms in steps, starting with an experimental phase where the envisaged reorganisation is only applied to selected parts of the science system; invite volunteers for this experimental stage by offering them incentives to participate;
- Review the results and outcomes of implementing the experimental phase and, based on lessons learned, make necessary amendments to planned reforms;
- Continue with the following phases of reform following a similar, gradualist approach;
- The reform process may imply the need for parallel science management models whereby the old management model will be gradually phased out as the new model is introduced.

Recommendation 2.6

Consider establishing an economy wide, microfinance-based entrepreneurship support scheme as an engine to drive development based on innovation and entrepreneurship:

- Liaise with international donor organisations to discuss the scheme concept and invite them to contribute donor support for its operations;
- Consider special incentives for attracting remittances to the scheme, including privileges for microcredit applicants who attract match funding from remittances;
- Entrepreneurship in agriculture and food processing can be a specific target;
- Include scheme options for entrepreneurial support to young people, including support to university start-ups and/or spin-offs;
- Target economy wide scheme coverage, with centres catering to local needs; facilitate local entrepreneurs in identifying their local development niches.

Chapter 3: Knowledge generation and innovation support institutions; industry-science linkages; innovative entrepreneurship and financing

Given the importance of knowledge generation and its commercialization through product or service innovations, Kyrgyzstan can draw upon its scientific and economic potential, but faces many challenges to be addressed by research and innovation policy in order to reach a higher level of international competitiveness and welfare. Policymakers in Kyrgyzstan recognize the importance of innovation and in recent years have designed specific programmes and measures to improve innovation performance. These include improvement of general framework conditions, concrete R&D funding schemes and international cooperation and partnerships. Nonetheless, implementation is hampered by various factors inherent to the policy environment and innovation system.

Recommendation 3.1

Policymakers should take steps to increase innovation activities in the business sector, helping boost both knowledge generation and absorption capacities. Support schemes should pay particular attention to both internationalization and FDI. Promising industries for such policy interventions include: pharmaceuticals, ICT, textiles, food processing, agriculture (including irrigation and greenhouse technologies), energy, mining technologies and tourism (new business models). There should also be a focus on small engineering companies that can generate locally invented technologies or adapt imported technologies. Further niches for Kyrgyzstan could include disaster related innovations, recycling and waste management, air pollution reduction technologies and water treatment. The authorities could consider the following:

- Identify sector-specific R&D and innovation capacities, and support them through modernisation of technical equipment and machines and by initiating specific R&D and innovation projects (with domestic, international or scientific partners);
- Address financial constraints concerning R&D and innovation investments in general and with regard to small enterprises in particular; implement an independent innovation fund or programme to support investment in R&D (see also chapter 2 of this review). Support from international donors could be requested for this purpose;
- Identify the “driving factors” of successful companies, and draw lessons from these case studies with a view to improving framework conditions for innovation and consider an awareness raising campaign on the social benefits of innovation;
- Take a systematic approach to attract foreign technologies or technology oriented firms by promoting Kyrgyzstan’s unique capacities in terms of existing firms, societal needs and challenges and scientific potential;
- Actively support export-oriented companies in their marketing and commercialisation activities; and
- Help innovation-oriented companies to find suitable technologies abroad and support their adoption and adaptation.

Recommendation 3.2

The national authorities should consider strengthening and restructuring the science sector to become an integral part of the national innovation system. Such a shift could include a focus on specific technologies needed for local industry and society, a concentration of activities and organisations and differentiation between institutes according to their specific mission (e.g. education and teaching, scientific basic research, applied research, small-scale production). A further recommendation concerns the establishment of internal structures for the exploitation and commercialization of inventions and technologies and with a view to developing linkages with the business sector. The authorities could consider the following:

- Improve framework conditions for scientific research by increasing institutional funding and competitive funding; applied research for companies could be rewarded by additional grants, with possible support from international donors;
- Authorities should consider implementing a system of incentives and performance criteria to improve outputs and processes;
- Reduce legal impediments regarding the commercialization of scientific results, including the possibility to establish start-ups at scientific research institutes;
- Consider reducing the number of research institutes and universities (53) to larger and more focused units; “mini-institutes” with only a few researchers should be merged with other institutes to achieve a “critical mass” of competencies;

- The future university landscape could be differentiated into a group of research-oriented universities (with possible industry linkages) and teaching universities; funding mechanisms should be reconsidered to ensure adequate financing so universities are not forced to diversify away from their core mission of teaching and, where applicable, research;
- Promising (but currently fragmented) approaches at specific universities and institutes to cooperate with the enterprise sector could be strengthened by the government identifying and providing support to “pilot projects”; in addition to research, support should also be provided for student internships;
- Consider favourably in the recruitment process evidence of business contacts and international business activity of university professors or teachers;
- Provide financial support for the creation of central units at universities and research institutes to establish business contacts and the internal support of scientists with regard to inventions and IPR issues (e.g. patent exploitation departments). This could be in cooperation with donor organisations and the private sector.

Recommendation 3.3

There is general awareness among policymakers of the importance of new companies for economic modernisation. However, it is now important to develop systematic and programmatic approaches to support. Regulation that allows the establishment of new companies in the science sector is also lacking. The concrete implementation of legislation to protect investors needs to be improved, with enforcement of contracts a particular challenge. The authorities could consider the following:

- Introduce a start-up programme for innovative companies, including the necessary infrastructure (e.g. establishment of incubators at research institutes), improvement of financing conditions for new companies and advisory services;
- Create a culture of entrepreneurship in the business sector, science sector and the administration; motivate local investors to be open to new technologies and innovations;
- Strengthen the already existing and successfully operating private initiatives (e.g. OLOLO or KG Labs) by supporting their specific approaches and models;
- Think about the potential role of the Kyrgyz diaspora as investors and business contacts abroad;
- Support teaching and research institutes in implementing entrepreneurship education in their curricula.

Recommendation 3.4

Human resources is a critical factor in a knowledge-based and innovative society. Kyrgyzstan has implemented a “business oriented” system of higher education, with the share of public funding amounting to only around ten percent. Consequently, government expenditure on tertiary education is lower than, for instance, in Belarus or Armenia. According to several interviewees, the education system in Kyrgyzstan is regarded as a weakness, with businesses highlighting a lack of engineers and technical personnel, and graduates from vocational schools with poor skills that are not adapted to market needs. Existing state curriculum standards - a mandatory component with a list of compulsory subjects - hamper the academic mobility of students and are not responsive to changes in the labour market. The following could be considered:

- Human resources development and qualifications at all levels need to be improved and considered a top policy priority;
- Engineering and technical programmes at universities should be expanded, and quality improved;
- The establishment of business schools at universities where students of technical disciplines can receive a complementary education, building on efforts made at the Kyrgyz National University;
- Improve vocational training in terms of consistency with business sector requirements and overall length and intensity of training (two months in Kyrgyzstan compared to two years in many countries);
- Continue to cooperate with foreign institutions in the area of vocational training (e.g. Germany) and adopt good practices.

Recommendation 3.5

Business services for supporting innovation known from modern innovation systems are not yet fully developed in Kyrgyzstan. Technoparks that support start-ups and bridge the gap between science and business are so far absent. The National Academy of Sciences has made progress in creating the concept of a Technopark, but no major activities are yet present, while the Free Economic Zone emphasizes production rather than innovation.

Overall, the intermediary landscape is not currently suitable to support innovation in general, or interactions between innovation stakeholders in particular. Therefore the following measure could be considered:

- Provide the necessary legal and financial base to create Technoparks at selected universities or research centres (identify those universities where business linkages or commercialization activities are already well established);
- Free Economic Zones should be supported to also become innovation centres with international linkages. Support should be provided to build managerial and institutional capabilities and establish functional linkages with domestic research institutes;
- Existing plans to establish incubators at universities (e.g. at the Kyrgyz Turkish Manas University) should be strengthened and transferred to other research institutes;
- Technology transfer centres, start-up centres and a (private) venture capital or business angel culture should be initiated, with the support of international organizations or donors (e.g. Eurasian Development Bank plans to establish a Technopark for ICT).

Chapter 4: Measuring innovation performance: an international perspective

Kyrgyzstan de facto lacks an innovation policy, which is not exceptional for middle-low income economies. With expenditures on R&D only 0.1% of GDP and a very limited number of innovative firms, innovation policy cannot be framed in conventional terms by focusing on R&D and organised innovation activities as they are very marginal. Innovation policy is always complex, as ex-ante the major challenges for industrial and innovation policies are not known. Knowledge and technical skills requirements for industry and innovation policies are demanding, with results delivered often many years beyond electoral cycles and with a need for collaboration with private sector while avoiding regulatory capture and rent seeking.

Nonetheless, despite these complexities, effective innovation and industrial policies are essential to catch up through technology upgrading and productivity growth, as well as employment growth. However, given huge resource and institutional differences, it would be a mistake simply to imitate best practice in high income economies. For example, adopting only horizontal innovation policy instruments focused solely on “commercialization” of R&D would ignore key areas of technology upgrading to enhance productivity, management practices, production capability, quality and engineering i.e., all non-R&D activities. Likewise, a narrow focus on technology transfer organisations or technoparks/clusters would fail to address a variety of sector-specific blockages to growth, productivity and internationalisation.

The entirely horizontal approach ignores heterogeneity among sectors and is usually correct in identifying generic constraints to growth. However, its weakness is that the list of generic constraints could be very slow to yield results. In fact, we have very limited evidence on the effects of horizontal policies despite their dominance. Sector-specific (vertical) policies are explicitly selective and target technological upgrading in particular industries. The problems that these policies face are how to engage in the process of defining of policies but not being unduly captured by specific sectoral interests.

The authorities could formulate specific policy support actions in sectors identified as key potential sources of economic growth. Each area would require a specific policy package that can evolve over time based on initial support measures and the active involvement of non-government actors, primarily industrial associations and other non-governmental organisations.

A focus on innovation policy does not negate the need for continued structural reform. For example, according to the EBRD Transition Report 2017 sectoral level transition indicators there are major gaps in all corporate sectors except ITC, as well as in energy (natural resources, sustainable energy, electric power, in infrastructure (water and wastewater, urban transport, roads, railways,)), and in financial sector (banking, insurance and other financial services, SME finance, capital markets, private equity). Kyrgyzstan needs to improve its business environment and progress in structural reforms significantly.

Recommendation 4.1

Kyrgyzstan should develop a strategic approach to Foreign Direct Investment (FDI) and integration into Global Value Chains (GVCs), taking account of new opportunities such as the “One Belt One Road” initiative and integration initiatives in the Eurasian Economic Union. This could include:

- Identifying promising sectors for further support through a process of “smart specialisation” and public-private dialogue;
- Using existing free economic zones as a potential starting point to build on;
- Prepare tailor made packages to attract investors in different areas like clothing, food, call centres, etc. that include skills and training programmes that may be cost-shared with foreign investors or international donors;
- Assist export promotion in the clothing and food industries linked to a programme of improving quality and meeting health and safety and international exporting standards. This should be in collaboration with industry associations and international donors;
- Design a specific package of support measures and preferences for companies that are willing to meet quality and other requirements within an internationally assisted program of technology upgrading.

Recommendation 4.2

There is a need to modernize the science and research sectors through increased investment and strengthening industry-science linkages. Policymakers should recognise the extent to which the network of research institutes of the academy of sciences has already been transformed under challenging conditions of limited public funding and a “survival mode of operation”. There is a potentially large untapped demand by SMEs for technical services, testing services and problem-solving skills. In fact, R&D institutes and some universities already operate as a substitute for the missing knowledge-based services sector. Kyrgyzstan does not have large enterprises, so SMEs need for their growth infrastructure in the form of a network of technical institutes. Some of the research institutes are already engaged in collaboration with SMEs and could further profile themselves in a direction similar to German Fraunhofer or Steinbiss foundation institutes. In particular, the authorities should consider:

- Establish a programme of transformation of the existing research institutes (many of which are within the National Academy of Sciences) into network of technology institutes that support industry, in particular SMEs;
- Use technology institutes to create small but profitable improvements by extending established technology to smaller firms;
- Provide support to demand from SMEs for innovation support from research institutes and the knowledge-intensive business services sector through appropriate policy measures such as innovation vouchers and tax incentives;
- Those institutes which are in upstream science areas closer to basic research should be integrated into universities and in that way could improve both qualities of education and quality of teaching. There are already many cases of formal and less formal collaborations between Academy institutes and universities, and this transformation would speed up already initiated bottom-up process.

Recommendation 4.3

Kyrgyzstan has an extensive education system that, at present, provides mass education at low or moderate quality levels. While progress has been made in terms of investment in education, there is now an urgent need to invest in improving the quality of education. The authorities should consider:

- Increasing quality of education through a programme of international training for teachers;
- As recommended in Armenia and Tajikistan, authorities could consider a similar scheme to Kazakhstan’s Bolashak programme for teachers, based on highly competitive selection and provision of promising career opportunities. For this government should approach donors’ community and propose funding agreement based on cost sharing;
- Educational curricula should be modernised in consultation with industry to ensure they correspond to the needs of employers. Harmonization with the EU Bologna process should be considered.

Recommendation 4.4

Public procurement as an instrument of innovation policy is not developed in Kyrgyzstan. Public procurement is an unused opportunity to couple local demand in public sector development to local technological capabilities. In a small economy where sophisticated local demand is quite limited, and access to foreign markets problematic, innovation focused public procurement should be a policy priority. For the time being, policy makers are unaware of the potential of this instrument. A first application could be in the ICT sector, given

demand for improved ICT services linked to e-government reforms. Elements of this could be developed as local content requirements in public procurement contracts with foreign operators.

Recommendation 4.5

The National Statistical Committee is often highlighted as an island of excellence. Indeed, there have been substantial modernization efforts and harmonization with international statistical standards. While existing innovation statistics represent a first step in this direction, they are not fully internationally harmonised. Kyrgyzstan would need to expand its statistical coverage to Structural Business Statistics (SBS); Trade by Enterprise Characteristics (TEC) and Entrepreneurship Indicators (Business Demography, BD). These areas would give policymakers a better understanding of business dynamics in the economy and would contribute to better understanding of industrial changes at the micro level.

Chapter 5 Innovation in the enterprise sector

Sometimes innovation policies have been designed without identifying the problems to be solved by implementing the policy. The aim of this chapter was to analyse the enterprise sector in Kyrgyzstan for identifying the challenges of their innovation activities. The key problems and the potential policy instruments to be used for solving the problems are presented at the end of each section. This last section takes a “helicopter perspective” to provide some key recommendations for policymaking.

Recommendation 5.1

A functioning business environment fosters the creation of new firms and facilitates innovation and sustainable growth in the enterprise sector with accompanying social, environmental and economic benefits. In Kyrgyzstan, corruption and informality in both public and private sectors represent significant barriers to innovative firms. Despite significant improvements in procedures for starting a business, several processes and procedures for doing business and trading across borders require attention. E-government is one possible way to streamline processes and simplify administration, while transport infrastructure and services also need urgent action. It is recommended that government improve the business environment by selecting a mix of actions with short-term and long-term impact with indicators to monitor progress and identification of the responsible authority.

Recommended actions to improve the business environment in the short term are to:

- reduce corruption and crime through more efficient enforcement of legislation
- reduce red tape by streamlining administrative processes and procedures
- improve transportation infrastructure and its maintenance
- publish regular progress reports on actions taken

Recommended actions to improve the business environment in the long term are to:

- develop a culture of professional integrity and accountability
- strengthen public attitudes and demands for anti-corruption
- implement ethical codes of conduct in both private and public organisations

Recommendation 5.2

Economic reliance on gold extraction and agriculture leaves Kyrgyzstan highly sensitive to external factors beyond the control of national policymakers. Economic development is at the factor-driven phase, with competitiveness based on a low cost workforce, low value added products and price. The shift to a more advanced stage of economic development with require economic diversification, for which innovation and entrepreneurship will be key vehicles, requiring investment in the education of innovators and entrepreneurs. The economy is dominated by small businesses and individual entrepreneurs, with a trend towards an even smaller size of entity. While informality is a significant distortion to competition, a new generation of entrepreneurs is emerging. However, these knowledge-technology intensive entrepreneurs need an environment enabling interaction and entrepreneurial experimentation.

Recommended actions to foster the creation of knowledge-intensive start-ups in the short term are to:

- improve incentives for starting formal businesses, and regularising informal ones
- establish business acceleration and incubation activities at universities and other training institutions
- monitor Government procurement and introduce measures to encourage the participation of small businesses

- set up a cooperative scheme to foster emerging entrepreneurial communities and knowledge-technology intensive sectors

Recommended actions to foster the creation of knowledge-intensive start-ups in the long term are to:

- facilitate university-industry collaboration for exposing students to entrepreneurial opportunities
- integrate entrepreneurship into education at all educational levels for strengthening attitudes, knowledge and skills to act in an entrepreneurial manner

Recommendation 5.3

Kyrgyz firms emerge across four “innovator profiles”: Low Performer, Incremental Performer, Radical Performer and High Performer. Each profile faces its own challenges, with different policy responses being appropriate and different desired outcomes. To improve technological sophistication and productivity, the High Performers are important, while the Incremental, Radical and High Performers are all important for the creation of new jobs. Radical Innovators tend to be especially important to create opportunities for female employees. In order to identify potential new innovators, Low Performers may represent an important talent pool. Thus, the Low Performers should be supported to become Incremental or Radical Performers, while Incremental Performers should be supported to implement more radical changes. The Radical Performers should be supported to exploit commercially their innovations. The High Performers should be supported to take a role in international markets, with Kyrgyz firms having a shortage of knowledge linkages, especially international ones. Many Kyrgyz firms have selected a closed innovation model in which innovations are developed in isolation and where the major collaborators, if any, are local or national customers and suppliers. There is limited understanding of the systemic concept of an innovation ecosystem and a linear view of innovation policy tends to emphasise inputs (scientific knowledge and finance) and technological outputs (patents). Finally, the vast majority of Kyrgyz firms’ innovation activities are driven by short-term business needs, with virtually none exploring future business opportunities and creating new markets. is innovating by having their emphasis purely on today’s business.

Recommended actions to enhance innovation in enterprises in the short term are to:

- increase the knowledge and awareness of policy makers and implementers of the range of innovations and innovators
- develop instruments for identifying potential innovators and their specific problems
- develop a collection of policy instruments to respond to these problems
- identify the systemic impact of different kinds of innovations and innovators
- raise awareness of positive case studies to serve as role models

Recommended actions to enhance innovation in enterprises in the long term are to:

- gather and disseminate business foresight information
- improve strategic understanding of innovation in both private and public organisations
- increase awareness of the systemic view of innovation policy

Chapter 6 The role of eco-innovations and social innovations as a pillar of sustainable development

Recommendation 6.1

Businesses will not incur the financial expense and the risk of innovation in areas critical for sustainable development if there is no market demand for the resulting sustainable products, services and production processes. Government policy can play a key role in stimulating demand from domestic businesses and consumers. Government can also be a direct source of demand in its role as a customer procuring innovative sustainable goods and services from the business sector. This market shaping or market creating role of Government is critical to provide a clear medium-term frame of reference for innovators and investors. The authorities could consider the following measures:

- Mainstream sustainability into primary, secondary and higher education in order to raise the awareness of the population about sustainability issues, thereby preparing the ground for consumer demand for innovative sustainable products. The United Nations Economic Commission for Europe for instance has a programme on Education for Sustainable Development which develops and disseminates international good practices in this regard. This requires training of teachers on sustainable development issues and the development and updating of relevant teaching materials.

- Define sector-specific targets for environmental performance to be reached within e.g. ten years. Different targets should be set for different sectors, including industry, construction - including commercial and residential buildings - agriculture, mining, tourism, and transport – including public and private individual transport.
- The targets should cover efficient resource use and reductions of negative environmental impacts.
- Create a nation-wide system of monitoring of progress towards these targets using key performance indicators. The results of the monitoring should be used to adjust targets and supporting policies as necessary over time.
- Promote the development and adoption of voluntary standards and labels for energy efficiency, emissions of pollutants, and recycling. These standards and labels could be developed in cooperation between the Government and producer and professional associations. This should also include the development of independent certification processes for Kyrgyz producers.
- Where necessary, complement targets and standards with mandatory regulations, including monetary penalties for non-compliance and liabilities for damages to the environment.
- Integrate these standards and targets in all Government procurement programs. Sustainability should be made a criterion used alongside more traditional criteria such as price and quality to select vendors.

Recommendation 6.2

The domestic market of Kyrgyzstan is relatively small. Moreover, domestic demand for sustainable products and services may also be limited by the current level of economic development and per-capita incomes. In order to stimulate investments in innovative sustainable production processes, it is therefore also important to target demand from international markets. Government can play a key role in facilitating this. The authorities could consider the following measures:

- Facilitate the adoption by Kyrgyz producers of existing international standards and eco-labels. As in the case of voluntary national standards, the Governments can support compliance by facilitating the access of Kyrgyz producers to internationally recognized testing and certification services.
- Create international promotion campaigns raising awareness abroad about sustainable products from Kyrgyzstan on the basis of internationally recognized standards and labels.
- Work with the nascent tourism industry to develop eco-branding and to promote Kyrgyzstan as a destination for sustainable tourism.
- Facilitate the participation of Kyrgyz companies with sustainable products and production processes in foreign trade fairs.

Recommendation 6.3

Shaping and creating markets for innovative sustainable products, services and production processes also requires innovative approaches to policy making. Moreover, it places additional demands on the capabilities of Government agencies to implement these policies. It is therefore necessary to invest in the skills of civil servants tasked with developing and implementing policies in this area. The authorities may want to consider:

- Further mainstreaming sustainable development into the curricula of the Academy for Public Administration.
- Creating programmes for civil servants and policy makers to participate in international exchanges of knowhow and experience with their peers on policies, laws, and regulations promoting innovation for sustainable development and their implementation.
- Creating platforms for dialogue between Government implementing agencies and producers and consumers affected by policies and regulations aiming to facilitate the development and adoption of sustainable innovative products, services and production processes.
- This kind of dialogue can be used both during the phase of developing policies and during the implementation phase. It can greatly enhance the quality and effectiveness of policies and their implementation by enhancing transparency and by creating a feedback mechanism through which policies and regulations can be improved over time in light of experience.

Recommendation 6.4

In addition to stimulating the demand for sustainable products and services, the Government also has an important role to play in supporting the supply of innovative solutions to sustainability challenges. Government policy should be calibrated to the level of economic development of the country and should focus on the priority areas which the Kyrgyz Republic has set for itself in its sustainable development strategy. It should support both the development of innovative sustainable products and processes domestically and the adoption and adaptation of innovative solutions from abroad. The authorities may consider the following options:

- Define priority areas for research with potential applications in fields relevant for the national sustainable development strategy of Kyrgyzstan.
- Provide additional dedicated funding for research projects in these areas.
- Encourage the transfer of research results in these areas to industry and their translation into new sustainable products and processes by providing dedicated research funding to universities and academic institutes conditional on co-financing from the private sector.
- Further encourage the participation of Kyrgyz researchers and research institutes in international research networks focused on solving sustainability problems.
- Provide funding for research and development aiming to modernize the traditional know-how in foods, forestry, personal care, textiles, housing.
- Mainstream national sustainable development priorities into foreign direct investment policies by systematically considering the impact of foreign direct investment projects on the sustainable development of the Kyrgyz Republic and facilitating the diffusion of foreign knowledge about new sustainable practices to domestic businesses and workers.

Recommendation 6.5

In order to create appropriate incentives for businesses to invest in the creation of innovative sustainable products, services and business practices, and for consumers and customers to adopt these innovations rapidly and on a broad scale, it is critical for supporting policies to be consistent and for them to reinforce rather than to counteract each other. Policy consistency is especially important because the goal of sustainable development is to achieve several policy goals simultaneously, including economic growth, environmental sustainability and social inclusiveness. This will require policies in very different spheres to be coordinated, including in the social sphere. To enhance policy consistency, the authorities may wish to consider to:

- Gradually remove consumer and producer subsidies for fossil fuels and water use and to move towards market prices which reflect the full cost of using these resources, including the negative effects their use may have on the environment and the long-term sustainable development of Kyrgyzstan. By artificially lowering the prices of these resources, these subsidies reduce the incentives for consumers and producers to adopt more sustainable alternatives. By extension, this reduces the incentives of potential innovators to invest in innovations that would provide these sustainable alternatives.
 - Provide additional financial support to poor citizens in order to cushion the impact of price increases for fuel and utilities. Lessons can be learned in this regard from other countries.
 - Review existing subsidies for the introduction of sustainable technologies and products in step with the removal of the above subsidies for non-sustainable ones. As subsidies for non-sustainable products and practices are phased out, and thus counter-productive incentives are diminished, it may become possible to achieve sustainability goals at lower cost by reducing the subsidies for sustainable practices.
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