

PROJECT INFORMATION DOCUMENT (PID) CONCEPT STAGE

Report No.: PIDC7008

Project Name	Kazakhstan: Fostering Productive Innovation Project (P150402)
Region	EUROPE AND CENTRAL ASIA
Country	Kazakhstan
Sector(s)	General industry and trade sector (100%)
Theme(s)	Other Private Sector Development (100%)
Lending Instrument	Investment Project Financing
Project ID	P150402
Borrower(s)	Ministry of Finance
Implementing Agency	Ministry of Education and Science
Environmental Category	B-Partial Assessment
Date PID Prepared/ Updated	09-May-2014
Date PID Approved/ Disclosed	06-May-2014, 13-May-2014
Estimated Date of Appraisal Completion	27-Jun-2014
Estimated Date of Board Approval	31-Oct-2014
Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

Kazakhstan is an upper middle-income resource-rich economy with significant but quite narrow R&D and human endowments. Its main natural resource assets are both mineral (oil, gas, ferrous and non-ferrous metals) and renewables (mainly agriculture) sectors.

Kazakhstan's economic growth increased from 5 percent in 2012 to 6 percent in 2013 driven by stronger private consumption and investment. At the same time, weaker external demand led to a deficit in the current account in 2013 and to a sharp devaluation of the local currency in February 2014. Despite short-term vulnerabilities accentuated by uncertain global and regional economic outlook, Kazakhstan's medium-term prospects are positive with strong growth to continue on the back of the expanding oil sector and structural reforms envisioned by the long-term vision "Kazakhstan-2050 Strategy" (hereinafter called Strategy).

The comprehensive long-term Strategy (outlined by President Nazarbaev) envisions country's

transition to the knowledge economy within 10-15 years and joining the top 30 most developed countries by 2050. Having implemented number of successful strategic reforms, during the last five years the country has been focusing on diversifying away from resource-based growth through a major industrialization and innovation support program and a number of SME development activities. In the long run, structural reforms envisioned by the development Strategy are set to foster competitiveness of the economy by improving the country's endowments—human capital, infrastructure and institutions. The Strategy clearly indicates strong commitment to build a knowledge economy that would drive growth, diversification and global competitiveness.

The Strategy highlights seven priority areas for action by the government, including improved potential of science. Financing of science is set to reach three percent of GDP, with an objective to increase scientific capacity, accelerate knowledge and technology transfer through FDI and to improve efficiency of the National Innovation System (NIS) and its basic institutions. Productive innovation is rightly understood as a key growth factor pervading and effectively linking together all areas of economy and society. Strengthening innovative capacity of an economy requires increase of innovativeness in practically all areas contributing to nation's global competitiveness. In this regard, contextual understanding of innovation is very important since current level of economic development of Kazakhstan limits its ability to translate absolute innovations into economic competitiveness. Instead, adapting and efficiently using existing global knowledge and practice would be the most cost and time effective way to boost innovative capacity to the level of critical mass that would generate a culture of innovative competition in all sectors of economy and society.

Recognizing the need to focus on seven priority areas in order to sustain the mid-to-long run economic growth, Kazakhstan needs to demonstrate a strong ability to sustain balanced and inclusive growth, its success in diversifying its endowments, namely, creating highly skilled human capital, improving the quality of physical capital, strengthening institutional capital and its ability to make innovation more active element of economic growth—all of the necessary ingredients for the development of the private sector. The proposed operation will provide important medium-term input to the implementation of “Kazakhstan 2050 Strategy”.

Sectoral and Institutional Context

Brief overview of the National Innovation System (NIS)

Kazakhstan's innovation system is characterized by existence of several relatively capable institutions designed to support innovation but lacking productive linkages between them. At a higher level, the Ministry of Education and Science (MoES) is responsible for development and financing R&D, whereas supporting company level innovation and provision of respective funding and stimulus rests with the Ministry of Industry and New Technologies (MINT). This dichotomy results in low commercialization requirements for scientific results on one side and lack of quality deal-flow on the other side. Kazakhstan has set up different institutions and has developed many programs aimed at encouraging innovation and modernization.

While these are valuable initiatives, their proliferation has stressed the need for coordination across policy actions and institutions. Consistency at the level of the overall program goals, mechanisms for the coordination of development initiatives and implementation is quite weak. The effectiveness of public intervention is also often limited by the underdevelopment of innovation services, innovation intermediaries and market infrastructure. Applying a policy mix that embodies a

systemic view of innovation considering the importance of interaction between various components of the NIS should also lead to a reinforcement of horizontal mechanisms of coordination, which still remain relatively weak. There is a need to further develop the NIS, emphasizing linkages, including those going beyond the primary focus on technological forms of innovation. This is an area which definitely deserves more attention and should remain in the focus of policy makers in the foreseeable future.

R&D spending is 0.17% of GDP, which is only two thirds of the pre-crisis level and 52.2% is spent by public and higher education sectors with 40.3% of corporate sector (that includes and is dominated by SOEs) expenditures indicating very low share of R&D funded by private companies. The number of organizations conducting research decreased from 424 in 2010 to 345 in 2012. The number of IP protection applications decreased from 1850 in 2010 down to 1468 in 2012. Joint research statistics for 2010-2012 indicate a slow overall increase from 386 to 411 with distinct increase of partnerships with corporate sector (38%) and supplier side (233%) accompanied by sharp decrease of partnerships with end users (37%), scientific organizations (21%) and universities (24%). This data indicates a problem of a persisting R&D commercialization gap that the NIS is so far unable to tackle. The government recognizes that closing this gap is a priority area for the reform efforts to allow effective translation of R&D investments into growth and global competitiveness of the entire economy. A few countries with endowments similar to Kazakhstan present an experience of successfully managing this process.

In addition to establishment of an institutional framework of the NIS, Kazakhstan has developed in the recent ten years the following three innovation assets which will help promoting innovation-based linkages: (a) about 20 modern laboratory facilities, (b) a significant number of research teams of junior and senior scientists (financed by the World Bank financed Technology Commercialization Project, TCP, P090695) and (c) a government program to develop talent for innovation by funding young people to receive Master and PhD degrees in leading Western universities (the Bolashak program). These efforts seem to have positive impact on the performance of Kazakhstani science which is reflected in improvement of global citation index of Kazakhstani researches based on Web of Science and Scopus databases.

Key challenges facing the National Innovation System

Kazakhstan needs to find its own way of competitively integrating itself into global value chains by building on its unique set of endowments. At present the economy has limited capacity to benefit from large FDIs to extractive sectors in terms of developing productive horizontal and vertical linkages that would help the economy move higher along the value chain. Innovation is the natural way of adopting and adapting to new things and Kazakhstani science should be enabled to innovatively link up the extractive part of the economy with other sectors generating new products and services.

Kazakhstan recently introduced competitive grant financing of R&D and established a good selection mechanism drawing on international expertise, but this system does not set any requirements regarding commercialization of research results. As a consequence, the development of prototype without good prospects for commercialization continues. To compound the problem, Kazakhstan lacks important elements of providing financial instruments and solutions suitable to different stages of startup company development. As a result, many technology startups fall below the radar of few venture capitalists present in Kazakhstan.

To respond to this key challenge of economic growth would mean addressing the following two key problems:

Lack of productive sector involvement. More than a half of (quite small) R&D expenditures are executed by public research institutes and universities. Backward linkages from extracting industries and metallurgy are very limited. There is little history of collaborative projects between enterprises of the productive sector, research institutes and higher education. The persistent lack of trust between these three major stakeholders of the NIS constitutes a vicious cycle. Nevertheless, enterprises of the productive sector are pragmatic and at least some of them are interested in collaborating with national research organizations in order to solve technological problems. In other words, they are interested in problem-solving. The science establishment has been encouraged to collaborate with industry but has little knowledge how to do it. One needs a capable intermediary to broker a joint collaborative effort, particularly of a longer-term nature.

Underdeveloped and fragmented commercialization cycle. Kazakhstan science and related government support policies still build on linear model of commercialization of R&D results that does not relate with market needs up until the prototype is developed. As a result, several Kazakh scientists and research institutes have accumulated a number of inventions that are not of interest for market.

Government strategies and actions underway to address issues in the National Innovation System

Several actions are already underway to implement the government strategies. The Government, the World Bank and other donors have launched projects to address the challenges in the NIS.

First, the Government has been undertaking different measures and policies to make innovation a key driver of its economy, including establishment of basic institutions, launching the State Program of Accelerated Industrial and Innovative Development 2010-2014 to achieve, among others, increase of share of innovative enterprises up to 10% of active companies, Business Road Map 2020, Employment 2020, and the Concept of Kazakhstan's Innovative Development 2020. While being major effort, these programs so far have yielded mixed results without notable growth of innovative SMEs in non-extractive sectors to large extent due to lack of attention to building productive linkages between different components of the NIS.

Second, approved in 2008, the World Bank financed Technology Commercialization Project (TCP, P090695), has been successful in three areas: (a) successfully developing the knowledge base for innovation through a senior and junior research grant programs demonstrated by emerging success stories in competitively selected research, (b) establishing new organizations (Technology Commercialization Office, TCO and International Material Science Center, IMSC) likely to become central in Kazakhstan's innovation system and (c) supporting technology start-ups and spin-offs, as demonstrated by emerging promise in techno-entrepreneurship. The World Bank is preparing another project (KZ Competitiveness and Access to Finance Project, P147705) in parallel and in coordination focused on increasing economic competitiveness and diversification of the SME sector in Kazakhstan by, among other things, enhancing and expanding current Government programs, and introducing new targeted interventions to improve capacity of entrepreneurs and SMEs for business development.

Third, The World Bank and the Government of Kazakhstan have been involved in activities to support diversification of the Kazakhstani economy, including through the promotion of a modern innovation system, since 2005. Past activities have included studies through the JERP on topics related to diversification; technoparks; supplier development program. In 2010 the World Bank provided intensive capacity building technical assistance to the National Agency of Technological Development in technology commercialization including ability to identify critical stages of technology commercialization that are unaddressed by the present day national innovation system.

The WBG remains the main contributor to reform areas in the innovation ecosystem of the government. Other donors provide ad hoc support to specific initiatives. Similar to IFC, some bilateral agencies are involved in direct investment financing with private sector.

During the April mission, the team will undertake a Pragmatic Innovation System Assessment which will help to update the analytical foundation to strengthen the basis of the preparation of this project.

Rationale for the World Bank involvement in the project

- The government requested the WB to consider this operation, based on TCP emerging success.
- The request is in line with country CPS and main government strategies.
- The WB is the main donor engaged in the country in this area.
- The WB has adequate skills and experience in helping the client to design the operation and provide implementation support after its effectiveness.

The proposed operation will provide important medium-term input to the implementation of the 2050 Strategy. The Government's effort of the past 20 years and the World Bank financed TCP created a complex set of organizations. The priority at this stage is consolidation, coordination and achievements of synergy between these organizations in order to transform research and development into goods and services valued by market. The proposed operation will help to leverage the TCP achievements and take this promise and the emerging success to the next level by scaling the TCP activities and building on the pilot innovation programs introduced by the government in the recent years to make innovation more active element of economic growth. The TCP has demonstrated that right incentives can generate scientific collaboration with strong commercial orientation and there is a potential to stimulate innovative collaboration of larger groups and organizations on the basis of technology consortia, prototyped by the IMSC established under TCP. Before its closure in 2015 the TCP will also yield comprehensive regulatory framework review and technology audit that will serve important inputs for removing existing barriers and better adjustment of support tools. The International Science and Commercialization Board (ISCB) has been playing important role in guiding MOES in realization of the TCP and promoting international practice of conducting commercially relevant R&D. The Technology Commercialization Office (TCO) established under the TCP benefits from direct assistance and capacity building of reputable international contractor CRDF Global, which has no precedent in Kazakhstan.

The above supports the rationale for a new operation. The other rationale is that the World Bank has access to good global practice related to designing this type of projects in middle income and high income countries that serve as a benchmark for Kazakhstan.

During the Mid-Term Review of the TCP project in October-November 2013, authorities expressed an interest in designing a follow-up investment operation to build on the early success of the TCP and requested the Bank team to prepare a concept paper for their consideration. The concept note was accepted by the authorities in principle in December 2013.

Relationship to CAS

The project is linked to the first pillar of Kazakhstan's Country Partnership Strategy (CPS) FY12-FY17 on improving competitiveness and fostering job creation. The project aims to support the Government targets of attaining more balanced growth through sustained improvements in competitiveness and economic diversification. The operation will focus on Innovation pillar of the index contributing to improvement of such critical areas as: i) capacity for innovation, ii) quality of scientific research institutes, iii) company spending in R&D, iv) university-industry collaboration in R&D, v) availability of scientists and engineers, and vi) PCT patents and applications. The project was not originally contemplated in the CPS because it has emerged from recent policy dialogue on scaling up emerging successes under TCP and fostering translation of technology commercialization into improved competitiveness of the economy with the Ministry of Education and Science and Prime Minister's Office. Similarly to TCP, the project will help achieving country development goal on achieving competitiveness gains through macro-stability and international integration (in global value chain).

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

The PDO is to promote high-quality, nationally relevant research and commercialization of technologies.

Key Results (From PCN)

The PDO level results indicators include:

- Number of international publications from Senior and Junior Research Groups in peer-reviewed journals
- Share of enterprise sector financing of R&D in Senior and Junior Research Groups
- Total turnover of the consortia (including the project grant and enterprises' contribution)
- Number of technology-based start-ups created under the project and making commercial sales
- Number of Patent Cooperation Treaty Agreements approved for project beneficiaries
- Number of license agreements signed

III. Preliminary Description

Concept Description

Building on the visible achievements under the TCP project, the new operation would expand and adapt the range of instruments used in the TCP and pilot innovation programs introduced by the government in recent years.

Component 1 - Development of the Knowledge Base for Innovation (\$40 million): Assure appropriate R&D and advanced human capital for the Innovation Consortia Component (2) and Technology Commercialization Cycle Component (3). This component will finance:

a) Grants to research teams (\$30 million). Based on the TCP project, the sub-component will finance two types of grant instruments for eligible R&D ideas: one for young researchers (a continuation of the Junior Researcher Group Program) up to \$0.6 million each and one for internationally recognized researchers up to \$1.5 million each (a continuation of the Senior Scientist Group Program). Grantees must incorporate themselves as companies. Semiannual research progress will be monitored by the ISCB through field visits. The eligibility criteria would include new features, such as emphasis on proven interest/partnership of private/corporate sector in the proposed research, researcher/company co-financing. The grant could finance laboratory equipment, workshops, visiting scholars, etc.

b) PhD training abroad in technical areas strategic for Kazakhstan's economy (\$10 million). This may include expansion of the Bolashak education program supporting PhD-level training and/or a pilot higher education consortium between Kazakhstan and relevant Western university of excellence such as London's Imperial College or Colorado School of Mines. The Bolashak program is about providing education grants for Kazakhstani students to pursue Master's, PhD, residency and internships in foreign universities based on approved list of priority education areas/specialties. The project would finance support of joint international research activities for student already abroad, potentially with KZ diaspora.

Component 2 – Innovation Consortia (technology platforms and engineering centers) (\$35 million): Promote collaboration among the existing scientific research institutes and design bureaus, 20 scientific and engineering profile laboratories and between these research centers and world's innovation leaders through, for instance, R&D and technology consortia – a new instrument - and provide a demonstration effect of companies developing value chains and clusters through innovation. Selection of suitable laboratory facilities in Kazakhstan to form a consortium will be done through open competition which mandates international collaboration and the co-funding of users and clients as prerequisites. The grants would be awarded for consortia addressing strategic problems relevant for Kazakhstan's future (related to energy, minerals, metallurgy and agriculture). The winner would receive a MoES grant for upgrading itself to international standards while pursuing the declared R&D goals. The grant conditions would allow purchase of additional equipment, renovation and, among others, would require adoption of good laboratory practices, international certification. It is expected that up to 10 user-driven innovation clusters would be developed between major Kazakh and global companies, including multinationals involved in oil and gas drilling in the country. The IMSC is one example of such consortium in the current project, although institutional configurations of consortia are expected to vary.

Component 3 – Consolidation of the Technology Commercialization Cycle (\$35million): This component would draw on the activities of the TCP, utilizing results of technology audit, technology commercialization grants program and comprehensive R&D regulatory framework review. In addition to TCP experience, this component would draw upon technology commercialization support programs developed by the Ministry of Industry and New Technology (MINT) and other government agencies. It would include four sub-components and finance the following activities:

a) Innovation matching grants to provide early stage support for commercialization of R&D results (\$10 million). This sub-component would draw on the existing grant program of NATD (National Agency for Technology Development). The detailed design will be determined during preparation.

b) Early Stage VC Fund: Funding program for innovative SMEs to provide matching equity at the early stage of incubation of a firm for (i) Concept Development Grants (to support preparation and development of innovative business concepts, strategies, studies and plans in order to then attract external investment in their business by addressing key areas of risk) up to the amount of US \$15,000 and (ii) for Equity Investment up to US\$1 million (\$13 million). This activity will finance developing private-public venture fund for technology companies with significant /corporate sector contribution. It will be done in a form of a public contribution towards establishing Venture Fund, including management team remuneration. The design options of the fund will be discussed during the preparation mission.

c) Technology Acceleration Office Abroad (\$2 million.) to enhance capabilities of a technology and marketing satellite office located at a recognized center of excellence in technological innovation in USA (Silicon Valley, CA, Austin, TX) or Russia (Moscow or Skolkovo).

d) Network of Technology Transfer Offices (TTO) at major Kazakh universities (\$10 mln). This sub-component will enhance capabilities of existing TTOs with an objective to reach a critical mass of technology commercialization and transfer capabilities within a coherent network of 5-6 capable TTOs. Operating in concert with innovation matching grants (sub-component 3a), this sub-component will facilitate an adequate deal flow for the venture fund (sub-component 3b). It will finance goods and services (training, study tours) to upgrade capabilities of TTOs.

Component 4 - Innovation Council (\$5 million): Assure better coordination of the Innovation System between key stakeholders of National Innovation System, including mainly the Ministry of Education & Science, Ministry of Industry & New Technologies, Ministry of Agriculture, and Ministry of Oil & Gas. The Council would benefit from collaboration and advice from International Science and Commercialization Board under TCP. The TCO established under the TCP could serve as the secretariat of the Innovation Council. This component would draw on the experience of inter-agency Innovation Councils in such countries as Chile and Finland. The component would finance TA to set up the Council and build-up its capabilities and operating costs of running the Council.

Component 5 - Project management, monitoring and evaluation, awareness raising and capacity development (\$5 million): During preparation, the team will take into consideration earlier requests of MOES regarding TCP implementation arrangements in terms of expanding institutional learning stemming from project implementation to its subsidiary organizations such as Science Fund or Science Committee that are directly responsible for R&D quality and technology commercialization and have more flexibility and capacity in terms of project implementation. For example, the team will be looking into practicality of the MOES may delegating the responsibility for implementing the project or its certain components to other entities under the auspices of the MOES (for example, the Science Fund, TCO under the TCP, IMSC).

During preparation, the team will explore what kind of a beneficiary feedback mechanism the proposed implementation agency - the existing PMU under the Ministry of Science and Education for the ongoing Technology Commercialization Project (P090695) - has in use, assess whether it will meet the needs of the project or suggest to include an activity and/or an indicator to address it.

During preparation, the team will also consult the stakeholders about whether gender issues are relevant to the project objectives or components and make an action plan based on that.

IV. Safeguard Policies that might apply

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

V. Financing (in USD Million)

Total Project Cost:	120.00	Total Bank Financing:	100.00
Financing Gap:	0.00		
Financing Source			Amount
Borrower			20.00
International Bank for Reconstruction and Development			100.00
Total			120.00

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