

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

URUGUAY

INNOVATION PROGRAM FOR PRODUCTIVE DEVELOPMENT

(UR-L1096)

LOAN PROPOSAL

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ELECTRONIC LINKS	
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1.	Program Execution Plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38921614
2.	Monitoring and Evaluation Plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38907203
3.	Full Procurement Plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38918550
OPTIONAL	
1.	Annual Work Plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38924082
2.	Economic Analysis http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38906969
3.	Environmental and Social Safeguards Screening http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38740564
4.	Itemized Budget http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38907052
5.	Draft Program Operating Regulations http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38930134
6.	Aboal, D. et al. (2014), Innovación, Competitividad y Productividad en Uruguay [Innovation, Competitiveness, and Productivity in Uruguay] http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38921526
7.	Plan Estratégico Nacional de Ciencia, Tecnología, e Innovación [National Strategic Plan for Science, Technology, and Innovation] (PENCTI) http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38921518
8.	ANII (2014a), Informe de seguimiento de actividades año 2013 [Progress Report on 2013 Activities] http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38810628
9.	ANII (2014b), Informe de Evaluación. Impacto de los instrumentos de promoción de la innovación orientada al sector productivo [Impact evaluation report on instruments for promoting innovation in the productive sector] http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38930266
10.	CSI Ingenieros. Technology Development Program II, Performance Audit http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=38930353

ABBREVIATIONS

ANII	Agencia Nacional de Investigación e Innovación [National Agency for Research and Innovation]
AWP	Annual work plan
CHC	China Cofinancing Fund for Latin America and the Caribbean
GMI	Gabinete Ministerial de Innovación [Ministerial Cabinet for Innovation]
INE	Instituto Nacional de Estadísticas [National Statistics Institute]
IRR	Internal rate of return
MSMEs	Micro, small, and medium-sized enterprises
LIBOR	London Interbank Offered Rate
OECD	Organization for Economic Cooperation and Development
PDT	Programa de Desarrollo Tecnológico [Technological Development Program]
PENCTI	Plan Estratégico Nacional de Ciencia, Tecnología e Innovación [National Strategic Plan for Science, Technology, and Innovation]
R&D	Research and development
SMEs	Small and medium-sized enterprises
SNI	Sistema Nacional de Innovación [National Innovation System]
STI	Science, technology, and innovation
TFP	Total factor productivity

PROJECT SUMMARY

URUGUAY INNOVATION PROGRAM FOR PRODUCTIVE DEVELOPMENT (UR-L1096)

Financial Terms and Conditions					
Borrower: Eastern Republic of Uruguay			Flexible Financing Facility*		
			Amortization period:	24 years	
Executing agency: Agencia Nacional de Investigación e Innovación [National Agency for Research and Innovation] (ANII)			Weighted average life:	15.25	
			Original disbursement period:	6 years	
Source	Amount (US\$)	%	Grace period:	6.5 years	
IDB (Ordinary Capital)	20 million	28.56	Inspection and supervision fee:	**	
China Cofinancing Fund for Latin America and the Caribbean ***	20 million	28.56	Interest rate:	LIBOR-based	
Local	30 million	42.88	Credit fee:	**	
Total	70 million	100.00	Currency:	U.S. dollars from the Bank's Ordinary Capital	
Project at a Glance					
Project objective: The general objective is to support improvements in firm productivity and competitiveness. The specific objectives are to: (i) increase firm innovation capacities; (ii) strengthen human capital for innovation; (iii) boost the generation of scientific and technological knowledge; and (iv) enhance the ANII's capacity to design, execute, and evaluate public policies for science, technology, and innovation.					
Special contractual conditions precedent to the first disbursement: (i) entry into force of the execution agreement between the borrower and the executing agency, subject to the Bank's prior approval; (ii) the Bank's prior no objection for the subexecution model agreements to be signed between the program executing agency and beneficiary organizations (which should be included as annexes to the program Operating Regulations); and (iii) submission of evidence of the entry into force of the program Operating Regulations, in accordance with the terms previously agreed on with the Bank (paragraph 3.4).					
Special execution conditions: (i) all windows and calls for proposals that will competitively select the beneficiaries of the grant support will be governed by bidding documents and conditions that are consistent with the program Operating Regulations; where additional details to those set out in the Operating Regulations are included, the Bank's no objection for those bidding documents and conditions will be a special execution condition; and (ii) in the case of projects supported under the program that have a grant contribution of more than US\$150,000, the Bank's no objection to the project summary before signing the contract with the beneficiaries will be a special execution condition (paragraph 3.3).					
Exceptions to Bank policies: None.					
Project qualifies as:					
SEQ []		PTI []		Sector []	Geographic []
					Headcount []

- (*) Under the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, and currency and interest rate conversions. When considering such requests, the Bank will take into account operational and risk management considerations.
- (**) The credit fee and inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with the relevant policies.
- (***) This segment of financing will be governed by the provisions of document GN-2686-4. The terms and conditions of this segment of financing will be the same as those for the segment of financing with resources from the Bank's Ordinary Capital, including the applicable provisions of the Flexible Financing Facility.

I. DESCRIPTION AND RESULTS MONITORING

A. Background, problem addressed, and rationale

- 1.1 Uruguay's economy has expanded continuously in recent years, with an annual rate of growth averaging 5.2% over the last five years—surpassing the historical average. All expenditure components grew over the period. Consumption rose by 6.1% per year, investment by 6.9%, and exports by 3.8%. Unemployment reached record lows (6.9%).¹ However, the expansion in GDP was not accompanied by similar performance in total factor productivity (TFP). A recent study shows that productivity growth over the 1960-2011 period was systematically lower than in advanced nations such as the United States, and even compared to other countries in the region.² For example, while TFP in 1960 was 75% of that in the United States, in 2011 it was 40%. Although the last five years have seen an improvement, it has been insufficient to narrow this gap.
- 1.2 For growth to be more sustainable in the long term, Uruguay needs to make additional efforts to improve TFP and reduce the gap with the most advanced countries. To this end, international experience points to the importance (together with macroeconomic stability) of science, technology, and innovation (STI) policies that stimulate one of the critical elements in improving productivity: investment in research and development (R&D).³ In absolute terms, R&D investment has risen in Uruguay in recent years (from US\$110 million in 2008 to US\$199 million in 2011). As a proportion of GDP, however, it remains low. In 2011, Uruguay invested 0.4% of GDP in R&D—less than Argentina (0.6%), Brazil (1.2%), and member countries of the Organization for Economic Cooperation and Development (2.2%).⁴ Similarly, while the average Uruguayan firm invests 1.6% of sales in innovation, the regional average is 2.5% and the OECD average is 3.7%.⁵ The factors explaining low investment in R&D and innovation include: a low presence within the productive structure of firms and sectors that are innovation-intensive; a lack of specialized financing and advanced human capital; limited capacities for generating and using knowledge in the productive sector; and innovation policies that are still in their early stages.
- 1.3 **Structure of production.** According to data from the Instituto Nacional de Estadísticas [National Statistics Institute] (INE), there were approximately 150,000 firms in the country in 2012, of which 83% had less than 5 employees, 16% between 5 and 100, and the remaining 1% more than 100. The Department of

¹ [Data from the Instituto Nacional de Estadísticas \[National Statistics Institute\] \(INE\).](#)

² Fernández-Arias, Eduardo (2014). “Productivity and Factor Accumulation in Latin America and the Caribbean: A Database (2014 Update),” Washington, D.C., United States: Research Department, IDB.

³ Crespi et al. (2014). Investing in Ideas. Business Innovation Policies; IDB (2014), Rethinking Productive Development: Sound Policies and Institutions for Economic Transformation. Palgrave, Washington, D.C.

⁴ [Red de Indicadores de Ciencia y Tecnología \[Network of Science and Technology Indicators\]](#) and the [OECD](#).

⁵ IDB (2010). “Science, Technology, and Innovation in Latin America and the Caribbean: A Statistical Compendium of Indicators. Washington, D.C.: Inter-American Development Bank.

Montevideo accounted for 53% of firms, with the other 47% located outside of the capital—mainly in the departments of Canelones, Maldonado, Colonia, and Paysandú. In terms of sectors, more than 66% of companies were focused on trade, while manufacturing accounted for less than 10% of the total. Although there is evidence of a favorable trend towards greater diversification in Uruguay's structure of production, the presence of dynamic, high-technology sectors (electronics, pharmaceuticals, knowledge-intensive services, etc.) remains low. One factor that limits development of these sectors is the existence of coordination failures, both among firms and between firms and research centers.⁶ Moreover, innovative behavior among firms in existing sectors (as measured by technological and organizational innovation and the number of patents) is low by OECD standards.⁷ Variations in intrasectoral productivity levels are also marked: only a few companies in each sector exhibit cutting-edge practices in the areas of production, business, and innovation, while the majority lag behind. This situation reflects information asymmetries that affect technology dissemination processes. Organizational rigidities and a lack of information regarding technologies and markets represent obstacles to innovation in 30% of firms.⁸ Consistent with these data, Uruguay's score on the economic complexity index is slightly higher than average for the region (0.23 versus 0.18), but six times lower than in the OECD (1.13).⁹ A recent study estimates that this low level of productive complexity accounts for 40% of the private sector deficit in R&D investment compared to the OECD.¹⁰

- 1.4 **Specialized financing.** Externalities and uncertainty in innovation processes hinder their financing by the conventional financial sector, particularly in countries such as Uruguay where financial markets are small and lack sophistication. Credit to Uruguay's private sector stands at 20% of GDP—half the regional average, and a quarter of the level for advanced countries. The supply of venture capital and subsidies for innovation is also comparatively low (only 2% of firms have received government support for innovation, lower than the regional average of 4%). This is consistent with the fact that 25% of local companies point to the low supply and high cost of financing as an obstacle to innovation.¹¹ A recent study found that this

⁶ The results of the Fourth Survey of Innovation Activities in Industry show that innovative firms are increasingly closed organizations. Cooperative relationships among firms aimed at producing knowledge have failed to expand, and links with research centers are both very limited and in decline. In Uruguay, 15% of firms cooperate on innovation, while in countries such as South Korea, Finland, and Sweden, the figure is approximately 40% (IDB, 2010).

⁷ IDB (2010).

⁸ INE (2010). IV Encuesta de Actividades de Innovación en la Industria Uruguaya [Fourth Survey of Innovation Activities in Uruguayan Industry].

⁹ This index measures the complexity and diversification of a country's export basket. A good is complex when it is produced by a small number of countries that produce a wide range of goods. IDB (2014).

¹⁰ Aboal, D. et al. (2014). [Innovación, Competitividad y Productividad en Uruguay](#) [Innovation, Competitiveness, and Productivity in Uruguay]. Press report.

¹¹ INE (2009). Encuesta de Innovación [Innovation Survey]. Uruguay.

problem accounts for 12% of the gap in private R&D investment.¹² Lastly, the problem of a lack of financing is more severe for newer and smaller companies, which depend on reinvested profits and their own capital for innovation.¹³

- 1.5 **Advanced human capital.** Recent economic growth—driven by natural resource-intensive sectors and a few knowledge-intensive services—has been accompanied by greater demand for advanced human capital. However, the supply of such capital is insufficient to meet demand.¹⁴ The availability of engineers and technologists in Uruguay has lagged. The number of engineering and technology graduates in 2011 (22 per 100,000 inhabitants) was four times lower than in Chile. The gap in terms of Master's and doctoral graduates is higher still (eight times lower than in Chile). This lack of human capital accounts for 25% of the labor productivity differential with the United States and 50% of the differential with South Korea (OECD, 2014). It also explains 20% of the gap in private R&D investment compared to the OECD.¹⁵ In the opinion of corporate executives, the lack of advanced human capital is a hurdle to innovation in 30% of firms, a figure that rises to 40% in the case of small and medium-sized enterprises (SMEs) (INE, 2013). In addition, although Uruguay has a significant and well-trained diaspora, it has not so far been able to implement systematic strategies to support positive synergies between highly qualified emigrants and the National Innovation System (SNI).
- 1.6 **Generation and productive application of knowledge.** Public investment in science has increased in Uruguay, while its scientific productivity—at 0.15 publications per researcher—is 50% higher than the regional average. Nonetheless, the evidence shows that the application of this knowledge for production purposes is quite limited, as reflected in the number of patents per researcher (0.025), which is 20% lower than average for the region.¹⁶ This owes in part to an excessive emphasis on basic research, as opposed to applied research relating to concrete issues. According to the Red de Indicadores de Ciencia y Tecnología [Network of Science and Technology Indicators] (RICYT), the proportion of basic research is greater than in the United States (21% versus 17%). The performance of Uruguay's research centers is also limited by a lack of technological infrastructure and knowledge transfer capacities. A recent study¹⁷ indicates that 87% of R&D units require new equipment (either to replace old ones or to undertake new lines of research and provide services to firms). Researchers consulted indicated that new mechanisms need to be developed to improve the efficiency of purchase and use processes for major items of equipment.

¹² Aboal, D. et al. (2014).

¹³ Encuesta MIPYME [MSME Survey] (2013).

¹⁴ The employment content of exports grew by more than 100% from 1998 to 2011. The demand for labor grew at all skill levels, but particularly in the case of advanced and semi-advanced human capital. Export-related demand for advanced human capital rose by a factor of 2.3 over the same time period (OECD, 2014).

¹⁵ [Network of Science and Technology Indicators](#) and Aboal et al. (2014).

¹⁶ Data available in Aboal et al. (2014).

¹⁷ Batista B. et al. (2012), [Relevamiento Nacional de Equipamiento Científico Tecnológico](#) [National Survey of Technological Scientific Equipment].

- 1.7 **Policies to promote innovation.** In recent years, the country has modernized its institutional framework for the promotion and execution of STI activities. An institutional reform was undertaken in the middle of the last decade which resulted in the creation of the Gabinete Ministerial de Innovación [Ministerial Cabinet for Innovation] (GMI) (responsible for setting policy in the area of STI) and the Agencia Nacional de Investigación e Innovación [National Agency for Research and Innovation] (ANII) (responsible for policy implementation). The Plan Estratégico Nacional de Ciencia, Tecnología, e Innovación [National Strategic Plan for Science, Technology, and Innovation] (PENCTI) was approved in 2010.¹⁸ Alongside these reforms, new R&D and technology transfer centers were created (the Montevideo Pasteur Institute, the Pando Science and Technology Park, and the Technological University) and existing ones were strengthened (Universidad de la República and private universities, Technological Laboratory of Uruguay and the National Institute for Agricultural Research). Nonetheless, overall government efforts remain low by international standards, and there are opportunities for these organizations to work in a more coordinated fashion, aimed at resolving the country's priority challenges. Furthermore, although the ANII has played an important role in the recent institutional strengthening process (with an annual budget that grew from US\$5.5 million in 2008 to US\$35 million in 2013), the institution is still a young one, and it needs to consolidate its governance and its ability to manage more complex promotion instruments aimed at addressing the country's current and future challenges.¹⁹
- 1.8 **Prior interventions and their results.** The Bank has provided support for STI policies in Uruguay since the early 1990s. The Science and Technology Program (loan [646/OC-UR](#)) was approved in 1991, providing support for scientific infrastructure and human resources development. In 2000, the Technological Development Program (PDT I) (loan [1293/OC-UR](#)) was approved. This supported building institutional capacities for the competitive financing of research and innovation projects.²⁰ In 2008, the Technological Development Program II (PDT II) (loan [2004/OC-UR](#)) was approved.²¹ Under this project (which is close to completion), 298 enterprise innovation projects were financed, as well as 69 innovative enterprises, 23 equipment projects for scientific and technological services, 154 grants for local and international postgraduate studies, more than

¹⁸ [PENCTI](#) prioritizes three areas of technology (information and communications technology [ICT], biotechnology, and nanotechnology), and eight sectors or hubs that represent opportunities or problems: software, computer and audiovisual services, human and animal health, agricultural and agroindustrial production, environment and environmental services, energy, education and social development, logistics and transportation, and tourism.

¹⁹ The ANII's [Progress Report on 2013 Activities](#) (ANII, 2014a) contains an analysis of demand trends for promotion instruments, characteristics of that demand, and numbers of projects and amounts approved (by instrument) over the 2008-2013 period.

²⁰ The impact evaluation for PDT I, carried out in 2010 by the CENIT-CPAFerrere consortium, highlighted positive results in terms of increased private investment in innovation and knowledge generation.

²¹ PDT II (loan [2004/OC-UR](#)) for US\$34 million was approved in 2008; it is in the final stages of execution, with 95% of resources committed and 81% disbursed.

300 mobility grants for scientists, and 25 research projects in strategic sectors. In terms of impact, an evaluation based on quasi-experimental methodologies suggests that additionality in terms of inputs is significant, given that the firms supported invest twice as much in innovation as the control group. Company investments net of subsidies are also found to have risen by a similar amount, pointing to a leveraging effect on private investment. There has also been an effect in terms of inducing investment, as a subset of the firms supported would not have invested without the subsidy. These results for investment are reflected in a 20% increase in the probability that beneficiary firms will introduce new products when compared to the control group. There is also preliminary evidence of a 22% increase in labor productivity, attributable to the promotion instruments evaluated.²²

- 1.9 **Lessons learned.** A recent analysis of more than 15 interventions implemented in the science, technology, and innovation sector in Latin America indicates that these have been effective in achieving planned outcomes in the areas of business innovation, building scientific and technological capacities, and accumulation of advanced human capital. The analysis also indicates that continuity in these types of interventions, together with their periodic evaluation, is key to achieving results.²³ In addition to these lessons, there are other, more specific ones from the PDT II that support the choice of design for this program. First, the instruments used under the PDT II failed to benefit companies and entrepreneurs in the country's different departments in a balanced manner, as more than 70% were from Montevideo. Second, support under the PDT II proved insufficient in the case of firms wanting to begin developing basic innovation capacity. In general, the evaluation criteria for the instruments created a bias towards firms with greater innovation capacity. Third, the parameters (amounts, terms, and relevance criteria) and diversity of the instruments were insufficient to focus the ANII's actions on the particular challenges of priority sectors and areas. Fourth, the design of PDT II instruments failed to create extended innovation paths (in which firms receive greater amounts of support as they embark upon projects with greater risk and technological and institutional complexity). Lastly, although the instruments used to support research and advanced human capital had an impact on the generation of new knowledge, the firms' use of them was limited. To correct this situation, mechanisms would be implemented to guide them on the basis of the firms' demand.
- 1.10 **Program strategy.** In addition to providing continuity to the successful actions under the PDT II, the present program will add value in two areas. The first concerns improvements to promotion instruments, involving (i) better tailoring of these instruments to productive sector demands and greater complementarity

²² ANII (2014 b), [Informe de Evaluación. Impacto de los instrumentos de promoción de la innovación orientada al sector productivo](#) [Evaluation Report. Impact of Instruments to Promote Innovation in the Productive Sector]. Working Paper 7. CSI Ingenieros (2014), [Auditoría de Desempeño del PDT II](#) [PDT II Performance Audit]. Other instruments under [PDT II](#), such as technology services and mobility grants, also received positive evaluations.

²³ IDB (2014), Innovation, Science and Technology Sector Framework Document, and IDB (2014) Chapter 3. A summary of this evidence is included in the Monitoring and Evaluation Plan.

among them, in order to create extended innovation paths (with support for the initial creation of innovation capacities in firms right through to participation in cooperation-based programs and the creation of links with research centers); (ii) a better targeting of efforts to the priorities set out in the current PENCTI and the firms' needs; and (iii) systematic experimentation with new instruments, including pilot testing and evaluations aimed at deciding whether to scale up their use. The second area, involving the ANII's management capacities, includes (i) developing alliances with intermediate institutions to stimulate innovation in SMEs²⁴ (particularly those outside of the capital in order to correct the geographical imbalance observed under the PDT II), and (ii) consolidating the institution's monitoring, evaluation, and learning capacities.

- 1.11 **Strategic alignment.** Within the framework of the Ninth General Increase in the Resources of the Inter-American Development Bank (document AB-2764) (GCI-9), this program will contribute to the lending priority of support to small and vulnerable countries. It will also contribute to the following outputs: (i) financing for SMEs, and (ii) individuals supported by productivity improvement programs, as defined in the Results Matrix. Lastly, the program is aligned with the Bank's Country Strategy with Uruguay for 2010-2015 (document GN-2626)—specifically, with the objectives, areas of work, and indicators for the science and technology sector (see paragraphs 3.12 and 3.13 of the strategy).

B. Objective and components

- 1.12 **Objectives.** The general objective is to support improvements in firm productivity and competitiveness. The specific objectives are to: (i) increase firm innovation capacities; (ii) strengthen human capital for innovation; (iii) boost the generation of scientific and technological knowledge; and (iv) enhance the ANII's capacity to design, execute, and evaluate public policies for science, technology, and innovation (STI).
- 1.13 **Component 1. Innovation for productive transformation.** The objective of this component is to increase investment in R&D and innovation capacities among firms by means of three complementary lines of support: one to improve innovation management capacities, another to stimulate individual R&D efforts in firms, and a third to support cooperation-based innovation processes. These lines are summarized below and described in detail in the [program Operating Regulations](#).
- 1.14 **Line 1: Innovation management capacities.** This line will include activities to support supply and demand for services to improve management capacities for incremental innovation processes. With respect to supply, support will be provided for projects by local intermediary institutions (selected on a competitive basis) to facilitate the introduction of new methodologies to support enterprise innovation management—preferably in SMEs—through the hiring of international experts with proven experience in the area. Business associations, nonprofit organizations,

²⁴ SMEs are defined as firms with between 5 and 99 employees and sales of between 10 million and 75 million indexed units (Decree 504/07, 20 December 2007).

and universities with experience in providing technical assistance to firms will be eligible. Projects will be evaluated according to criteria of technical quality (execution capacity, project alignment, background of the consultants to be hired, etc.) and impact (number and characteristics of beneficiary firms). The projects selected will receive grant support covering up to 80% of costs, to a maximum of US\$100,000 per project. Financing is planned for up to five institutions located in departments with the highest numbers of firms.

- 1.15 Support for demand will consist of financing for projects presented by local firms interested in improving their internal innovation capacities. Preference will be given to those that are beginning this type of activity and have not yet received support from the ANII. The projects may include training and technical assistance in the area of innovation management, and they will be selected on a rolling basis, using criteria of relevance (to objectives) and technical quality (execution capacity, project coherence, merit of the innovation management challenge, and commitment to continue innovating). The projects selected will receive grant support covering up to 70% of costs, to a maximum of US\$50,000 per project and a term of 18 months. It is estimated that 100 projects will be financed. Firms wishing to use this instrument may receive support from the strengthened intermediary institutions for preparing and implementing their projects. The intermediary institutions will receive payment for this service of up to 10% of the total grant value. They may also provide the innovation management and organization services included in the projects.
- 1.16 **Line 2: Innovation efforts of individual firms.** Financing will be provided under this second line for enterprise innovation projects presented by individual local firms. As a result of these projects, beneficiary firms are expected to significantly increase innovation activities (particularly R&D), developing innovations that are relevant at the country level with respect to products, processes, organization, or marketing. The projects will have two phases. The first one (the prototype phase) will involve technical validation and market analysis for emerging ideas, or the transformation of these ideas into prototypes. This phase will last up to 18 months. Firms that successfully complete the first phase may access a second one to support development of the innovation (the development phase) over a period of 24 months. Criteria for measuring success will include technical validation of the idea or prototype by ANII evaluators, and an analysis of market opportunities for the innovation. Those firms that fulfill these criteria may pass directly on to phase II. Projects will be selected on a rolling basis using criteria of economic feasibility (project benefits and company financial capacity) and technical quality (capacity of the team responsible for the project, innovation merit, technical feasibility, and the business plan [business plan does not apply to phase I]). The projects selected will receive grant support covering up to 70% of total phase I costs and 50% of phase II costs, to a maximum of US\$100,000 and US\$400,000 per project, respectively. It is estimated that 140 projects will be financed, of which around 30% will address priority technological areas established under the PENCTI in effect at the time the funds are allocated.

- 1.17 **Line 3: Cooperative innovation efforts.** This line will seek to increase enterprise innovation efforts by improving the coordination of firms with the supply of technological knowledge. To this end, support will be provided for three cooperation-based project modalities: (i) **Partnerships.** These projects will have the participation of at least one private firm and one R&D center, and they will involve activities to develop innovative processes or products and/or solve technological problems in firms; (ii) **Sector technology networks.** These projects will involve firms and institutions belonging to a priority value chain in the PENCTI in effect at the time the funds are allocated. The projects can include activities to detect technological bottlenecks, find solutions using R&D, transfer new technologies, train human resources, and disseminate good practices. To be eligible, networks must have at least three members (including firms, business associations, and/or R&D centers), a link agreement, and a designated manager and legal representative; and (iii) **Sector technology centers.** Financing will be provided for the creation of technology centers to improve the innovation capacities and competitiveness of sectors and productive chains identified as priority under the PENCTI in effect at the time the funds are allocated. A center is defined as a platform that promotes coordination between the supply of technology and firms and business associations in a productive sector. Eligible business associations and institutions must account for a significant share of value added or sector exports, as well as being legally constituted with a Board of Directors and a manager with relevant experience. Under all three modalities, projects will be selected on a rolling basis using criteria of relevance (consistency with PENCTI objectives and priorities), economic and financial feasibility (impact on competitiveness, sustainability through the sale of services and management of R&D, financial capacity), and technical quality (technological merits of the association, technical feasibility, governance, management capacity, etc.). The projects selected will receive grant support covering up to 70% of costs in the case of partnerships and networks, and 80% in the case of centers. Maximum amounts will be US\$400,000 for partnerships, US\$1 million for networks, and US\$4 million for technology centers. Maximum execution periods will be three years for partnerships and four years for networks and centers. It is estimated that 30 cooperation-based projects will be financed.
- 1.18 **Component 2. Human capital formation and attracting talent.** The objective of this component is to expand the supply of highly qualified human resources with a view to fostering R&D and enterprise innovation. Financing will be provided for four lines of support, summarized below and described in detail in the program Operating Regulations.
- 1.19 **Line 1: Strengthening of training in engineering and similar disciplines.** Two types of activity will be supported. The first will consist of financing for competitively selected projects to strengthen studies in engineering and similar disciplines, with reference to relevant international experience. Financing for the projects will be structured into two consecutive phases: one for diagnostic assessment and preparation of a strategic plan and another for implementation of the plan to improve training, research, and transfer processes in the courses. Project

evaluation will be based on criteria of technical quality and economic feasibility. The projects selected will receive grant support covering up to 80% of costs, to a maximum of US\$1.2 million (US\$200,000 in phase I and US\$1 million in phase II), over a maximum period of four years. Up to four projects will be financed. The second activity will consist of a grant mechanism to accelerate graduation among advanced engineering students working in firms. Funding will be provided to a maximum of US\$10,000 per beneficiary. It is estimated that 300 students will be financed; these will be selected through public calls for proposals based on criteria of academic merit and relevance.

- 1.20 **Line 2: Master's and doctorate-level studies in scientific and technological fields.** Support will be provided for the completion of Master's and doctorate-level studies in scientific and technological fields at prestigious local or international universities. Eligible individuals will be Uruguayan resident citizens with a university degree (or other equivalent higher education). They must be active in priority development areas and express a commitment to return to the country. Financing will be for a maximum amount of US\$120,000 per beneficiary, covering tuition, travel, and living expenses. Master's studies will be financed for up to two years, and doctoral studies for three years (with possible extension to four years). It is estimated that 310 professional candidates will be financed; these will be selected through public calls for proposals based on criteria of academic merit and relevance.
- 1.21 **Line 3: Strengthening of national postgraduate programs.** Financing will be provided for the creation and strengthening of Master's and doctoral-level programs offered by the country's public and private universities. These postgraduate programs should be aimed at educating professionals and researchers in scientific and technological areas identified as priorities under the PENCTI in effect at the time the funds are allocated. Financing will be provided in the form of grant support covering up to 80% of project costs, to a maximum of US\$100,000 for new postgraduate courses and US\$50,000 for existing ones. It is estimated that 15 projects will be financed; these will be selected competitively based on criteria of academic merit, relevance, and sustainability.
- 1.22 **Line 4: Circulating and attracting talent.** Financing will be provided for (i) visits to the country by researchers and technologists (foreign nationals or Uruguayans resident abroad) to support development of cutting-edge innovation, research, and training projects; and (ii) visits by researchers and technologists resident in Uruguay to technology centers, universities, or firms in other countries, with a view to acquiring skills and knowledge for application in their area of specialization upon return to Uruguay. Financing will be for up to US\$40,000 per project, with a maximum duration of 24 months. It will cover tuition, travel, living expenses, and inputs for R&D activities. A total of 250 projects are expected to be financed, and these will be selected on a rolling basis with reference to criteria of relevance, academic merit, and quality.
- 1.23 **Component 3. Generation of new scientific and technological knowledge.** The objective of this component is to promote the generation of new scientific and

technological knowledge, while also fostering its application in the productive sector and society. Financing will be provided for three lines of support, as summarized below and described in detail in the program Operating Regulations.

- 1.24 **Line 1: Generation of new scientific and technological knowledge.** Financing will be provided for applied R&D projects submitted by researchers engaged in R&D and technology transfer activities in public and private institutions. Projects will be selected competitively based on criteria of innovativeness, relevance, and technical quality (researchers' backgrounds, methodology and work plan, strategy for valuation, etc.). Financing will be provided in the form of grant support covering up to US\$120,000. It is estimated that 230 projects will be financed. Approximately 30% of projects will focus on areas and sectors identified as priority under the PENCTI in effect at the time the funds are allocated.
- 1.25 **Line 2: Valuation and application of knowledge.** Financing will be provided for design and implementation of a platform for the valuation of scientific and technological knowledge generated locally, taking into consideration international good practices. This platform will be dedicated to evaluating the results of research projects financed by the ANII and at identifying and implementing strategies for the valuation, transfer, and sale of knowledge to the productive sector and society. The platform is expected to support valuation processes in 50 projects financed by the ANII.
- 1.26 **Line 3: National scientific equipment systems.** Three types of activities will be financed with a view to developing interagency information systems to optimize the purchase, availability, and use of major scientific equipment. The first type will consist of five consultancies for the design and construction of national information and shared administration systems for major equipment. The systems will be shared among all R&D institutions in the country that own or use major scientific equipment and wish to join the systems. They should provide detailed information regarding their equipment and accept the rules governing its shared use. The second type of activity will consist of partial financing for projects to improve existing equipment, purchase complementary equipment, and train specialized human resources in techniques for the use and maintenance of major scientific equipment. Financing will be provided in the form of grant support covering up to 80% of project costs, to a maximum of US\$50,000. The third activity involves financing for projects to acquire new scientific equipment aimed at maintaining or expanding the capacity of national systems. Financing will be provided in the form of grant support covering up to 80% of project costs, to a maximum of US\$500,000. A total of 58 projects will be financed to improve and acquire equipment; these will be selected based on criteria of relevance (alignment with the requirements of the systems and their users) and technical quality (rationale, maintenance plan, environment for use and maintenance, etc.).
- 1.27 **Component 4. Generation of information and capacities for public STI policies.** This component will finance activities to improve both the ANII's learning capacity and STI policies at the national level, including (i) surveys of innovation activities in the industrial, service, and agricultural sectors; (ii) impact

evaluations for ANII promotion instruments; (iii) consultancies and meetings for the updating of PENCTI; and (iv) the launch of a fund to support STI public policy experiments. One of the experiments that will be financed concerns an innovative mechanism to introduce the concept of open innovation to the ANII, making intensive use of platforms for collaboration between the public and private sectors and academia. This mechanism will consist of three stages: (i) prioritization of topics, to be carried out by an ANII technical team in consultation with external experts and with the validation of the ANII Board; (ii) call for submission of problems, through which participants can express and rate their concerns; and (iii) call for submission of solutions, aimed at identifying and financing innovation projects to address the problems previously identified. Each public policy experiment to be financed under the program must have a technical proposal approved by the Bank.

C. Key indicators in the Results Matrix

- 1.28 **Expected outputs, impacts, and outcomes.** The program will have positive impacts on private investment in innovation, firm competitiveness, and labor productivity. Beneficiary firms are expected to increase their probability of exporting by 10% compared to a control group, and their labor productivity by 20%. Private investment in R&D is expected to rise by 20%. Consistent with these impacts, the following outcomes are expected: (i) an increase in R&D investment, in the rate of product innovation, and in the levels of partnership exhibited by beneficiary firms; (ii) a reduction in the number of firms that view access to qualified staff as a hurdle; (iii) an increase in the number of engineering graduates; (iv) greater knowledge production on the part of scientific and technological institutions; (v) an increase in the ANII's levels of efficiency and learning; and (vi) better targeting of funding for promotion on priority regions and sectors. Lastly, expected outputs refer to projects approved and financed for R&D and innovation activities with firms, consortia, institutions, researchers, and students, as well as development of the new PENCTI, knowledge products (innovation surveys and evaluations) and at least two STI public policy experiments (see Results Matrix, Annex II).
- 1.29 **Economic evaluation.** A [cost-benefit analysis](#) was carried out at both the aggregate level and for each component, with a 10-year horizon. It showed that the program has a positive social net present value of US\$93.9 million, and internal rates of return (IRR) that are higher than the 12% annual discount rate used by the Bank. The IRR is 34% for the first component, 30% for the second, and 30% for the third. The results are robust to a sensitivity analysis of the main program parameters: the impact on productivity, success of the projects, and externalities.

II. FINANCING INSTRUMENTS AND MAIN RISKS

A. Financing instruments

- 2.1 The total program cost is US\$70 million, of which US\$20 million will be financed from the Bank's Ordinary Capital, US\$20 million from the China Cofinancing Fund for Latin America and the Caribbean (CHC), and the remaining US\$30 million by local counterpart contributions from the borrower. The consolidated budget by component is laid out in Table 1 (Program cost), as well as in the [itemized budget](#).

Table 1. Program cost (US\$)

Component	IDB	CHC	Local counterpart	Total	%
Component 1: Innovation for productive transformation	7,250,000	7,250,000	8,900,000	23,400,000	33.4
Innovation management capacities	1,250,000	1,250,000	600,000	3,100,000	4.4
Business innovation	3,000,000	3,000,000	4,800,000	10,800,000	15.4
Cooperation-based innovation	3,000,000	3,000,000	3,500,000	9,500,000	13.6
Component 2: Human capital formation and attracting talent	5,750,000	5,750,000	8,050,000	19,550,000	27.9
Strengthening of engineering studies	2,000,000	2,000,000	3,000,000	7,000,000	10.0
Master's and doctorates	2,000,000	2,000,000	3,800,000	7,800,000	11.1
Strengthening of national postgraduate courses	250,000	250,000	500,000	1,000,000	1.4
Circulating and attracting talent	1,500,000	1,500,000	750,000	3,750,000	5.4
Component 3: Valuation and application of knowledge	5,000,000	5,000,000	12,950,000	22,950,000	32.8
Generation of new knowledge	1,500,000	1,500,000	8,500,000	11,500,000	16.4
Valuation and application of knowledge	750,000	750,000	500,000	2,000,000	2.9
National scientific equipment systems	2,750,000	2,750,000	3,950,000	9,450,000	13.5
Component 4: Generation of information and capacities for STI public policies	1,395,000	1,395,000	100,000	2,890,000	4.1
Surveys and evaluations	265,000	265,000	100,000	630,000	0.9
National STI Plan	130,000	130,000		260,000	0.4
STI public policy experiments	1,000,000	1,000,000		2,000,000	2.9
Evaluation, communications, and audit	315,000	315,000		630,000	0.9
Evaluation	25,000	25,000		50,000	0.1
Communication	250,000	250,000		500,000	0.7
Audit	40,000	40,000		80,000	0.1
Contingencies	290,000	290,000		580,000	0.8
PROGRAM TOTAL	20,000,000	20,000,000	30,000,000	70,000,000	100

B. Environmental and social safeguard risks

- 2.2 Given the nature of the program, and the fact that it involves institutional strengthening activities, no works or actions that might cause negative environmental and social impacts are involved. This has therefore been classified as a Category “C” operation in accordance with the IDB’s Environment and Safeguards Compliance Policy (operational policy OP-703), and no environmental strategy is required.

C. Fiduciary and other risks

- 2.3 During the analysis mission, a workshop on risk management was held in which the ANII and Bank teams participated. The workshop concluded that the level of risk is low. Nine risks have been identified, of which two were classified as high, four as medium, and the others as low. The high risks are as follows: (i) possible difficulties in coordination processes among institutions and firms, slowing the execution of cooperation-based innovation projects; and (ii) insufficient interest among researchers in collaborating, preventing the launch of national systems for major equipment. To mitigate the first risk, the ANII will assign a staff member to monitor cooperation-based projects on an ongoing basis. It will also organize workshops to discuss good practices based on successful cases. To mitigate the second risk, the ANII will hire facilitators to coordinate the different institutions involved in the use of scientific equipment. Together with the Bank, it will also organize a workshop on good practices with respect to national systems for major scientific equipment.
- 2.4 Sustainability. During program preparation, sustainability was analyzed according to two dimensions. The first relates to continuity in the lines of work or instruments proposed under the program components. In this respect, to the extent that these instruments are effective and efficient in reducing gaps (investment, capacities, etc.) created by market and coordination failures identified in the diagnostic assessments (Section A), they are expected to be sustained as part of the country’s public policies until such time as the failures have been rectified. The program includes funding and agreements on methodologies for building evidence regarding the effectiveness and efficiency of the proposed instruments. The second sustainability dimension analyzed concerns the projects to be financed under the program—particularly those that will support the creation of technology services and R&D centers and platforms. One of the criteria for evaluating these projects will be the existence of an adequate sustainability strategy based on the sale of services, R&D management, or contributions from the beneficiaries themselves.

III. IMPLEMENTATION AND ACTION PLAN

A. Summary of implementation measures

- 3.1 The borrower will be the Eastern Republic of Uruguay. The executing agency will be the Agencia Nacional de Investigación e Innovación [National Agency for Research and Innovation] (ANII). The ANII is a legal non-state entity under public

- law, created in 2008 by means of Law 18,084. Its mission is to execute the government's political and strategic guidelines in the area of research and innovation by promoting, coordinating, and strengthening the capacities of the National Innovation System (SNI). The ANII is experienced in executing Bank projects. It has been executing the PDT II (loan 2004/OC-UR) since 2009, and the Program to Support Future Entrepreneurs (loan 2775/OC-UR) since 2012. Performance—in terms of the fulfillment of outcome and financial execution indicators—has been good in both cases.
- 3.2 The ANII is governed by a Board of seven members, who represent the public and private sectors and academia. One member serves as president. General management of the ANII is the responsibility of an Executive Secretary who reports to the Board, under whom there are two areas (operations, and administration and finance) and five units (information technology, monitoring and evaluation, international cooperation, institutional communication, and coordination). The ANII has a team of 53 permanent professional staff and an annual budget of US\$35 million. The institutional design of the ANII is considered a good practice in the region, since not only does it provide for private sector representation on its Board of Directors, but it is also involved in the review of the relevance and technical merit of the projects to be financed. As a non-State legal entity, ANII has ample flexibility to manage a staff of high-level human resources and act in a nimble and transparent manner to support firms, researchers, scholarship recipients, and R&D centers.
- 3.3 Execution of all activities under the program will be the responsibility of the ANII's team of professional staff. The operations department will be responsible for (i) organizing financing windows and calls for proposals; (ii) advising beneficiaries; (iii) coordinating the evaluation of proposals presented by beneficiaries; (iv) formalizing contracts for the transfer of funding to beneficiaries (subexecuting agencies); and (v) monitoring the projects financed. All projects will be evaluated by committees of experts from outside the ANII, and approved by the ANII Board. All activities included in the projects will be carried out by the beneficiaries. All windows and calls for proposals for competitively selecting grant recipients will be governed by bidding documents and conditions that are consistent with the program Operating Regulations. Where additional details to those set out in the program Operating Regulations are included, the Bank's no objection for those bidding documents and conditions will be a special execution condition. In the case of projects supported under the program that have a grant contribution of more than US\$150,000, the Bank's no objection for the project summary before signing the contract with the beneficiaries will be a special execution condition. The Bank will be informed on a semiannual basis of other projects approved and contracted. The administration and finance department will be responsible for both payments to beneficiaries and program fiduciary management.
- 3.4 **The following will be special contractual conditions precedent to the first disbursement: (i) entry into force of the execution agreement between the borrower and the executing agency, subject to the Bank's prior approval;**

- (ii) the Bank's prior no objection for the subexecution model agreements to be signed between the program executing agency and beneficiary organizations (which should be included as annexes to the program Operating Regulations); and (iii) submission of evidence of the entry into force of the program Operating Regulations, in accordance with the terms previously agreed with the Bank.
- 3.5 **Fiduciary agreements and requirements.** Annex III contains the guidelines for financial management and procurement execution under the program. Procurement will be carried out directly by the ANII in accordance with IDB policies (documents GN-2349-9 and GN-2350-9). Funds transfers within the framework of the program will be governed by the procedures laid out in the program Operating Regulations and the ANII's procurement instructions, which will be included in the Operating Regulations. In observance of Bank policies (paragraph 3.10 (d), document GN-2350-9), the direct hiring of two specialized agencies (the National Statistics Institute and the Agricultural Statistics Department) is planned. These agencies, which are unique in their respective areas, will carry out the surveys planned under the fourth component of the program. There will be no retroactive recognition of expenditures for either loan or local counterpart funds.
- B. Summary of monitoring and evaluation arrangements**
- 3.6 Monitoring and evaluation will be carried out by the ANII's monitoring and evaluation unit in accordance with the guidelines contained in the Results Matrix (see Annex II) and the [Monitoring and Evaluation Plan](#). A final evaluation will be carried out once 95% of funds have been disbursed. This evaluation will use quasi-experimental methods such as double difference with paired statistics in the baseline, and regression discontinuity analysis based on proposal evaluation scores. The ANII will also submit semiannual reports describing the annual work plan activities undertaken, as well as compliance with the indicators in the Results Matrix.

Development Effectiveness Matrix				
Summary				
I. Strategic Alignment				
1. IDB Strategic Development Objectives		Aligned		
Lending Program		Lending to small and vulnerable countries.		
Regional Development Goals				
Bank Output Contribution (as defined in Results Framework of IDB-9)		i) Individuals benefited from programs to promote higher labor market productivity; and ii) Micro/small/medium productive enterprises financed.		
2. Country Strategy Development Objectives		Aligned		
Country Strategy Results Matrix		GN-2626	Increase company investment in R&D.	
Country Program Results Matrix		GN-2756-2	The intervention is included in the 2014 Operational Program.	
Relevance of this project to country development challenges (If not aligned to country strategy or country program)				
II. Development Outcomes - Evaluability		Highly Evaluable	Weight	Maximum Score
		9.9		10
3. Evidence-based Assessment & Solution		9.6	33.33%	10
3.1 Program Diagnosis		3.0		
3.2 Proposed Interventions or Solutions		3.6		
3.3 Results Matrix Quality		3.0		
4. Ex ante Economic Analysis		10.0	33.33%	10
4.1 The program has an ERR/NPV, a Cost-Effectiveness Analysis or a General Economic Analysis		4.0		
4.2 Identified and Quantified Benefits		1.5		
4.3 Identified and Quantified Costs		1.5		
4.4 Reasonable Assumptions		1.5		
4.5 Sensitivity Analysis		1.5		
5. Monitoring and Evaluation		10.0	33.33%	10
5.1 Monitoring Mechanisms		2.5		
5.2 Evaluation Plan		7.5		
III. Risks & Mitigation Monitoring Matrix				
Overall risks rate = magnitude of risks*likelihood		Medium		
Identified risks have been rated for magnitude and likelihood		Yes		
Mitigation measures have been identified for major risks		Yes		
Mitigation measures have indicators for tracking their implementation		Yes		
Environmental & social risk classification		B.13		
IV. IDB's Role - Additionality				
The project relies on the use of country systems				
Fiduciary (VPC/PDP Criteria)		Yes	Financial management: i) Budget; ii) Treasury; and iii) Accounting and Reporting.	
Non-Fiduciary				
The IDB's involvement promotes improvements of the intended beneficiaries and/or public sector entity in the following dimensions:				
Gender Equality				
Labor				
Environment				
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project				
The ex-post impact evaluation of the project will produce evidence to close knowledge gaps in the sector that were identified in the project document and/or in the evaluation plan		Yes	ANII's approach - based on the use of a combination of administrative and statistical data to systematically and periodically evaluate its instruments - is a clear reference point on how impact evaluations could be generated in a systematic and cost-effective way.	

This is the fourth of a series of IDB projects that have supported science, technology, and innovation policies in Uruguay with the aim of fostering productivity and competitiveness. This series of operations has contributed not only to the design, implementation, and development of policy instruments in this area, but also helped the country in setting up a system to systematically measure their effectiveness. The project is clearly aligned with both the Bank institutional priority and the country strategy.

The measures supported by the project are well described and clearly linked to the problems identified by diagnostic. The project will support both policy instruments that have been executed for several years and whose effectiveness have been proven through impact evaluations (such as the matching-grants for business innovation) and new policy instruments aimed at addressing new challenges emerged from the diagnostic (such as, for instance, the national system of scientific equipment). The result framework includes a clear set of measures of the project's expected effects taking advantage of the rich information systems set up by the executing unit (ANII) during the previous Bank operations.

The project's cost/benefit analysis is based on well spelled out assumptions on both the benefits and costs of the main interventions. The sensitivity analysis is also complete.

Finally the project includes a complete monitoring and evaluation plan. The effectiveness of the interventions will be measured through quasi-experimental studies which will benefit from the information systems and procedures set up by ANII. ANII's approach based on the use of a combination of administrative and statistical data to systematically and periodically evaluate its instruments is a clear reference point on how impact evaluations could be generated in a systematic and cost-effective way.

The risks identified in the risk matrix are rated for magnitude, include mitigation measures and related matrix to track their implementation.

RESULTS MATRIX

General and specific program objectives	The general objective is to support improvements in firm productivity and competitiveness. The specific objectives are to (i) increase firm innovation capacities; (ii) strengthen human capital for innovation; (iii) boost the generation of scientific and technological knowledge; and (iv) enhance capacities to design, execute, and evaluate public policies for science, technology, and innovation (STI).
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IMPACT INDICATORS

	Impacts	Unit of Measurement	Baseline	Target 2021	Means of Verification/Comments
1	Growth in work productivity $\Delta \ln\left(\frac{Y}{L}\right) = \Delta \ln\left(\frac{Y_t^B}{L_t^B}\right) - \Delta \ln\left(\frac{Y_t^{NB}}{L_t^{NB}}\right)$	Growth rate	0	0.20	Impact indicator aligned with the program's general objective. Calculated as the growth in labor productivity in beneficiary companies minus the growth in labor productivity in the control group. Source: Survey of Innovation Activities in Industry and Services (2010-2012). Labor productivity in firms belonging to the control group is US\$133,621. The control group is made up of those firms that apply for but do not receive financing. It is more similar to the beneficiary firms than any other group drawn from available statistics on companies.
2	Growth in firms' export propensity: $\Delta\left(\frac{X}{N}\right) = \Delta\left(\frac{X_t^B}{N_t^B}\right) - \Delta\left(\frac{X_t^{NB}}{N_t^{NB}}\right)$	Change in rate of exports	0	0.10	Impact indicator aligned with the program's general objective. Calculated as the change in the proportion of beneficiary companies that export minus the change in the proportion of control group companies that export. The proportion of control group companies that export is 0.32. Source: Survey of Innovation Activities in Industry and Services (2010-2012).
3	Total private investment in R&D	US\$ million	43	52	Impact indicator aligned with the country strategy. Calculated based on total R&D spending reported by the private sector in the National Survey of Innovation Activities in Industry and Services. Source: Survey of Innovation Activities in Industry and Services (2010-2012).

OUTCOME INDICATORS

	Indicator	Unit of Measurement	Baseline	Target 2021	Means of Verification/Comments
Specific objective I: Increase firms' capacity for innovation					
4	Growth in private sector investment in innovation (as a proportion of sales): $\Delta\left(\frac{I}{Y}\right) = \Delta\left(\frac{\bar{I}_t^B}{\bar{Y}_t^B}\right) - \Delta\left(\frac{\bar{I}_t^{NB}}{\bar{Y}_t^{NB}}\right)$	Change in the level of investment in innovation. In percentage points.	0	1.50	Calculated as the change in the ratio of investment in innovation to sales in beneficiary companies minus the change in the ratio of investment in innovation to sales in control group companies (per 100). Source: Survey of Innovation Activities in Industry and Services (2010-2012). Baseline: investment in innovation as a % of sales in the control group: 0.59.
5	Percentage of companies that participate in cooperation-based projects and that continue with this cooperation six months after project completion	Change in rate of cooperation. In percentage points.	0	0.30	Calculated based on ex post project monitoring indicators. Source: ANII internal information systems.
Specific objective II: Strengthen human capital for innovation					
6	Reduction in the % of firms with obstacles in relation to trained staff (difference between beneficiary and control group firms)	Change in rate of obstacles. In percentage points.	0	-0.10	Calculated as the change in the share of beneficiary firms reporting obstacles in human capital minus the same change in the control group. Source: Survey of Innovation Activities in Industry and Services (2010-2012). Baseline: 0.40 of the control group firms rated scarcity of trained staff as being an obstacle of medium or high importance.
7	Increase in the annual number of engineering graduates	# of graduates.	526	580	Calculated as the total number of engineering graduates by the end of the program. Source: Ministry of Education and Culture.
Specific objective III: Increase the generation of scientific and technological knowledge					
8	Increase in knowledge production on the part of scientific and technological institutions (difference between beneficiary and control group researchers)	Change in the rate of publication per researcher.	0	1.5	Calculated as the difference in the number of scientific articles published in indexed international journals by beneficiary researchers minus those of control group researchers. Source: <i>Currículo en Línea</i> (CVuy). Baseline: 1.72 peer-reviewed publications (with reference to the control groups used for evaluating INI 2008 and FCE 2007 grants). Refers to the number of publications per researcher prior to receiving support. Impact is measured over a similar window subsequent to project completion.

	Indicator	Unit of Measurement	Baseline	Target 2021	Means of Verification/Comments
9	Increase in the amount of scientific equipment managed collaboratively	Number of pieces of equipment registered and managed through national systems.	0	100	Includes all items that are registered with the national systems for major equipment and that are used through a centrally managed rotation system. Source: National Systems for Major Equipment.
Specific objective IV: Increase the ANII's capacity for the design, execution, and evaluation of STI policies					
10	MIDI efficiency index	Index score (0-6).	4	5	Source: Methodology for Mapping and Measurement of Institutional Performance (MIDI). Chrisney and Kamiya (2011); Developmentis (2014). Weighted average of indicators in the areas of financial execution, payroll expenditure, and budget management.
11	MIDI institutional learning index	Index score (0-6).	4	5	Source: Methodology for Mapping and Measurement of Institutional Performance (MIDI). Chrisney and Kamiya (2011); Developmentis (2014). Weighted average of indicators in the areas of managerial staff stability, knowledge management, and active management of networks.
12	Percentage of innovation projects in regions	% of projects in departments outside Montevideo.	28	35	Refers to the % of ANII projects invested in departments outside Montevideo. Source: ANII's internal information system and Informa ISA.
13	STI funds targeting priority programs	% of funds invested in cooperation-based programs.	17	40	Refers to the % of ANII funds for enterprise innovation that are invested in programs involving partnerships, sector technological networks, technology centers, and sector funds. Source: ANII's internal information system and Informa ISA.

OUTPUT INDICATORS

Outputs	Cost	Unit of Measurement	Baseline (*)	2015	2016	2017	2018	2019	Total	Comments and Means of Verification
Component 1: Innovation for productive transformation										
Projects with intermediary institutions	500	Institutions financed.	0	0	5	0	0	0	5	Project Management System.
Projects financed to improve enterprise innovation capacities	2,600	Firms financed.	113	0	10	30	30	30	100	Project Management System (baseline includes CME, RCE, MGC, and CHA).
Enterprise innovation projects financed	10,800	Firms and institutions financed.	181	28	28	28	28	28	140	Project Management System (baseline includes ACP, ACM, IAI, and PPI).
Cooperation-based innovation projects financed	9,500	Firms and institutions financed.	37	12	12	12	12	12	60	It is estimated that at least one firm and one institution will participate in each project financed. Project Management System (baseline includes ALI, DET, RTS, CTS, FSA, FSE, FPA, FST, and SID).
Component 2: Human capital formation and attracting talent										
Grants for studies in priority areas	3,000	Grant recipients.	0	60	60	60	60	60	300	Program administrative database.
Strengthening of engineering and technology studies	4,000	Courses of study strengthened.	0	0	2	2	0	0	4	Program administrative database.
Grants awarded for Master's and doctoral-level studies	7,800	Grant recipients.	848	80	80	80	70	0	310	Project Management System (baseline includes all grants for postgraduate studies, including local and foreign, Master's and doctorates, fundamental and priority).
Projects financed to strengthen national postgraduate courses in priority areas of engineering and technology	1,000	Projects financed.	25	0	15	15	0	0	15	Project Management System (baseline includes creation and strengthening).
Projects financed to circulate and attract talent	3,750	Individuals financed.	0	50	50	50	50	50	250	Program administrative database (post-doctorates, diaspora, mobility, etc.).
Component 3: Generation of new scientific and technological knowledge										
R&D projects financed for the creation of new scientific and technological knowledge	11,500	Researchers (PIs) financed.	225	46	46	46	46	46	230	Project Management System (baseline includes FMV, FPA, FSA, FSE, FSS, and FST). "PI" stand for principal investigator.

Outputs	Cost	Unit of Measurement	Baseline (*)	2015	2016	2017	2018	2019	Total	Comments and Means of Verification
Projects financed for the valuation and application of knowledge in the productive sector.	2,000	Projects financed.	0	0	20	20	10	0	50	Program administrative database.
Programs financed to strengthen national systems and databases for scientific equipment.	9,450	Projects financed.	23	0	0	22	24	12	58	Project Management System (baseline includes SCT and EQC).
Component 4: Creation of information and capacities for STI public policies										
Knowledge products financed (surveys, studies, and evaluations)	630	Knowledge products financed.	17	0	3	2	3	4	12	Baseline includes 2 Surveys on Innovation Activities in Industry, 2 Surveys on Innovation Activities in Services, 1 Survey on Innovation Activities in Agro, 2 surveys of perceptions, 1 survey of perceptions and vocations of young people, 7 internal evaluations of instruments, and 2 external evaluations of instruments.
National STI Plan	260	Document drafted.	1	0	1	0	0	0	1	Program administrative database.
Pilot testing financed for new innovation instruments	2,000	Evaluation report of pilot test financed.	0	1	1	0	0	0	2	Program administrative database.

Baseline (*): Cumulative from similar projects, 2008-2013.

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country: Uruguay
Project No.: UR-L1096
Name: Innovation Program for Productive Development
Executing agency: Agencia Nacional de Investigación e Innovación [National Agency for Research and Innovation] (ANII)
Prepared by: David Salazar and Nadia Rauschert (FMP/CUR)

I. EXECUTIVE SUMMARY

- 1.1 The fiduciary agreements and requirements established for this program are based on an institutional evaluation of the executing agency. This evaluation was carried out in June 2012 using the Bank's Institutional Capacity Assessment System (ICAS) and existing knowledge of the executing agency from its execution of loans 2004/OC-UR (Technological Development Program II) and 2775/OC-UR (Program to Support Future Entrepreneurs).
- 1.2 The total program cost is US\$70 million, of which US\$20 million will be financed from the Bank's Ordinary Capital, US\$20 million from the China Cofinancing Fund for Latin America and the Caribbean, and the remaining US\$30 million by local counterpart contributions from the borrower. The borrower and guarantor for the operation will be the Eastern Republic of Uruguay, and the executing agency will be the Agencia Nacional de Investigación e Innovación [National Agency for Research and Innovation] (ANII).

II. THE EXECUTING AGENCY'S FIDUCIARY CONTEXT

- 2.1 The executing agency's fiduciary background is considered to be very good, with a low level of risk. The ICAS evaluation completed in 2012 yielded very satisfactory results, while a risk workshop held during the analysis mission in June 2014 (using the project risk management methodology) found no fiduciary risks that warranted mitigation actions.
- 2.2 The ANII is a non-state public agency, and its activities and management environment therefore have a number of special features. In terms of country systems, the systems (or equivalents) that it will use are as follows:
 - a. Budget: once the loan has been approved, the Ministry of Finance will be asked to include the budget credit for the program in the national budget. Recently introduced budget software (known as "adapting planning") also provides cash flow projections.
 - b. Treasury: an account for managing program funds will be opened at the Central Bank of Uruguay, with operating accounts in U.S. dollars and local

currency. The authorizing agency for the expenditure is the ANII, through its Board.

- c. Accounting and financial reporting: the ANII will use the same accounting software that it already has in place (GIA by Datalogic). This software handles multiple currencies and issues periodic financial reports.
- d. Internal control: the ANII's internal control environment is satisfactory. Nonetheless, during the mission the importance of continuing to strengthen this subsystem through creation of an Internal Audit Unit was discussed.
- e. External control: program financial statements will be audited by an external private firm, which will be hired based on a call for proposals from firms eligible for Bank-financed projects. The same firm will audit the ANII's financial statements and those of the projects receiving subsidies.
- f. Procurement procedures: the executing agency and its staff have prior experience in conducting procurement in accordance with Bank standards. No specific problems that require immediate action are evident.

III. FIDUCIARY RISK EVALUATION AND MITIGATION ACTIONS

- 3.1 This program, considered to be LOW risk in fiduciary terms, will require monitoring actions to strengthen the control environment and ensure the efficient and effective administration of program funds.

IV. CONSIDERATIONS FOR THE SPECIAL PROVISIONS OF CONTRACTS

- 4.1 The agreements and requirements to be considered in the Special Conditions are as follows:
 - a. Exchange rate: for rendering accounts in U.S. dollars, the exchange rate used will be the one prevailing on the effective date of payment.
 - b. Audits of financial statements: audited statements for the previous financial year will be submitted before 30 April each year over the entire execution period. The statements must be audited by a private firm eligible for Bank-financed projects.

V. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

- 5.1 The procurement policies applicable to this operation are Policies for the Procurement of Goods and Works Financed by the IDB (document GN-2349-9) and Policies for the Selection and Contracting of Consultants Financed by the IDB (document GN-2350-9).
- 5.2 Funds transfers under the program¹ will be governed by the characteristics of each line of support, the corresponding procedures laid out in the program Operating Regulations, and the ANII's procurement instructions (which will be included in the Operating Regulations). Said instructions have been reviewed by the Bank.
- 5.3 **Procurement execution.** The Procurement Plan contains a breakdown of program procurements, and it lists (i) the contracts for goods and services and the transfers (projects and study grants) required to execute the program; (ii) the proposed methods for goods procurement and the selection of consultants, projects, and study grants; and (iii) the procedures used by the Bank to supervise procurement. The borrower will update the Procurement Plan every 12 months at a minimum, based on program needs. Any proposed modifications to the Procurement Plan must be submitted to the Bank for approval.
- 5.4 **Expenditure relevance.** Terms of reference, technical specifications, and the budget are the responsibility of the project team leader. In all cases, these will require the Bank's no objection before the procurement process may begin, based on the operational criteria of the project team leader.
- 5.5 **Procurement of works, goods, and nonconsulting services.**² Contracts subject to international competitive bidding will be carried out using the standard bidding documents issued by the Bank. Contracts subject to national competitive bidding will be carried out using national bidding documents satisfactory to the Bank.
- 5.6 No works are planned using loan funds.
- 5.7 **Procurement, selection, and contracting of consultants.** Consulting firms will be selected and contracted in accordance with Bank policies. Internationally advertised calls (values greater than US\$200,000) will be subject to ex ante review.
- 5.8 **Selection of individual consultants.** In accordance with Section V of the Bank policy set forth in document GN-2350-9, no shortlist is required and the Standard Request for Proposals will not be used.

¹ Transfers refer to grant contributions that will be awarded to the various types of beneficiaries selected on a rolling basis or through calls for proposals planned under the program.

² Policies for the Procurement of Goods and Works Financed by the Inter-American Development Bank (document [GN-2349-9](#)), paragraph 1.1: Nonconsulting services will be treated similarly to goods.

- 5.9 **Direct contracting.** In observance of Bank policies (paragraph 3.10.d, document GN-2350-9), the direct contracting of two specialized agencies (the National Statistics Institute and the Agricultural Statistics Department) is planned. These agencies, which are unique in their respective areas, will carry out the surveys planned under the fourth component of the program. (Details are provided in the Procurement Plan).
- 5.10 **Advance procurement and retroactive financing.** There will be no retroactive recognition of expenditures for either loan or local counterpart funds.
- 5.11 **Threshold amounts.** The threshold amounts for the different systems for the procurement of works, goods, and consultancies under the project can be found on the IDB website. **Main procurement procedures:** Procurements for the first 18 months are listed in the Procurement Plan (see electronic links). They do not entail any technical or procedural complexities that warrant specific mention.
- 5.12 **Procurement supervision.** The initial method of review will be ex post. This will be subject to change by agreement reflected in the Procurement Plan. International competitive bidding and consultancies valued in excess of US\$200,000 will be subject to ex ante review. The ex post review reports will not entail physical inspection visits.³ Given the low risk associated with this executing agency and the nature of activities, inspection visits will be replaced by verification during ex post reviews of the delivery of goods and services to beneficiaries.

VI. FINANCIAL MANAGEMENT AGREEMENTS AND REQUIREMENTS

- 6.1 **Programming and budget.** Evidence of the initial allocation of local counterpart resources by the executing agency (inclusion in the Annual Work Plan and the annual budget) will be provided during the compliance phase for conditions precedent, and thereafter on an annual basis (by the end of February).
- 6.2 **Accounting and information systems.** Project financial statements should be prepared in accordance with international financial reporting standards accepted by the Bank in its Financial Management Policy. They will be audited on an annual basis by a private firm eligible for Bank-financed projects.
- 6.3 **Disbursements and cash flow.** For the use of program funds, the ANII will open a special account at the Central Bank of Uruguay in the name of the program, in addition to one or more operating accounts (in U.S. dollars and Uruguayan pesos) for making payments.
- 6.4 **Internal control and audit.** Program Operating Regulations will be prepared, and these will include (among other things) procurement and payment procedures,

³ The inspections will verify the existence of the items procured, while leaving the verification of quality and specifications compliance to the sector specialist.

reporting arrangements, provisions for documentation archives, and control issues such as authorization levels and the periodic reconciliation of bank accounts and investments. External audit reports for the program and the review of disbursement processes and requests must be submitted by 30 April of the following year for each fiscal year during the disbursement stage. International Auditing Standards and the guidelines issued by the Bank will be taken into account in this process.

6.5 **Financial supervision plan.** The financial supervision plan is based on the following:

- a. A financial visit is planned during the first year of execution, as part of which information gathering regarding processes will be emphasized.
- b. Disbursements will be subject to ex post review, and verification will be carried out by the external auditors alongside presentation of their annual reports.

INNOVATION PROGRAM FOR PRODUCTIVE DEVELOPMENT

UR-L1096

CERTIFICATION

The Grants and Co-Financing Management Unit (ORP/GCM) certifies receipt of the non-objection from Ying Zhang, State Administration of Foreign Exchange (SAFE), dated July 31, 2014 for project “Innovation Program for Productive Development” for the amount of up to US\$20,000,000 chargeable against the China Co-Financing Fund for Latin America and the Caribbean (CHC).

Original signed

10/17/2014

Sonia M. Rivera

Chief

Grants and Co-Financing Management Unit

ORP/GCM

Date

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___14

Uruguay. Loan ____/OC-UR to the Eastern Republic of Uruguay
Innovation Program for Productive Development

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Eastern Republic of Uruguay, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Innovation Program for Productive Development. Such financing will be for an amount of up to US\$20,000,000 from the Ordinary Capital resources of the Bank, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

(Adopted on ____ 2014)

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___14

Uruguay. Loan ____/CH-UR to the Eastern Republic of Uruguay
Innovation Program for Productive Development

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, acting as Administrator of the China Cofinancing Fund for Latin America and the Caribbean, to enter into such contract or contracts as may be necessary with the Eastern Republic of Uruguay, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Innovation Program for Productive Development. Such financing will be for an amount of up to US\$20,000,000 from the resources of the China Cofinancing Fund for Latin America and the Caribbean, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

(Adopted on ____ 2014)