PUBLIC
SIMULTANEOUS DISCLOSURE

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

ARGENTINA

TECHNOLOGICAL INNOVATION PROGRAM IV

(AR-L1181)

FOURTH INDIVIDUAL OPERATION UNDER THE CONDITIONAL CREDIT LINE FOR INVESTMENT PROJECTS GENERAL TECHNOLOGICAL INNOVATION PROGRAM

(AR-X1015)

LOAN PROPOSAL

This document was prepared by the project team consisting of Pablo Angelelli (CTI/CCH), Project Team Leader; Gustavo Crespi (CTI/CUR); Gabriel Casaburi (CTI/CAR); Alessandro Maffioli (IFD/CTI); Claudia Suaznabar (CTI/CBO); Mariela Rizo (IFD/CTI); Blanca Torrico (IFD/CTI); Mikael Larsson (TIU/CCH); Ana Niubo (CSC/CAR); Brenda Alvarez Junco (FMP/CAR); Vanina Di Paola (CSC/CAR); Rodolfo Graham (LEG/SGO); and Christian Belmar (consultant).

CONTENTS

ANNEXES	
Annex I	Summary Development Effectiveness Matrix (DEM)
Annex II	Results matrix
Annex III	Fiduciary agreements and requirements

ELECTRONIC LINKS

REQUIRED

1. Multiyear program execution plan
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39603653
2. Monitoring and evaluation plan
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39603766
3. Procurement plan
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39578366

OPTIONAL

1. Annual work plan
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39603653
2. Economic evaluation
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39603907
3. Safeguard Screening Form for classification of projects
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39579622
4. Itemized budget
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39604119
5. Program disbursement plan
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39604119
6. Program Operating Regulations
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39604138
7. Vertical logic of the program
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39605040
8. Diagnostic analysis of major equipment
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39604142
9. Foundations for the strategic aquaculture project
   http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39605041
10. Demand for support for innovation and research
    http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39638734
11. References to verification reports on outputs, outcomes, and impacts of technological innovation programs TIP I and TIP II
    http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39635736
12. Tentative list of technological innovation projects with high sector and regional impact to be financed by the program
    http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=39638749

ABBREVIATIONS

ANPCyT	Agencia Nacional de Promoción Científica and Tecnológica [National Agency for the Promotion of Science and Technology]
CCLIP	Conditional Credit Line for Investment Projects
CIECTI	Centro de Estudios Interdisciplinarios de Ciencia and Tecnología [Center for Interdisciplinary Studies in Science and Technology]
EAP	Economically active population
FONARSEC	Fondo Argentino Sectorial [Argentine Sector Fund]
FONCyT	Fondo para la Investigación Científica and Tecnológica [Science and Technology Research Fund]
FONTAR	Fondo Tecnológico Argentino [Argentine Technology Fund]
MINCyT	Ministry of Science, Technology, and Productive Innovation
OECD	Organization for Economic Cooperation and Development
R&D	Research and development
S&T	Science and technology
SME	Small and medium-sized enterprise
SNI	Sistema Nacional de Innovación [national innovation system]
STI	Science, technology, and innovation
TFP	Total factor productivity
TIP	Technological innovation program
UEAC	Evaluation and Quality Assurance Unit
UGSA	Socioenvironmental Management Unit

PROJECT SUMMARY

ARGENTINA
TECHNOLOGICAL INNOVATION PROGRAM IV
(AR-L1181)

FOURTH INDIVIDUAL OPERATION UNDER THE
CONDITIONAL CREDIT LINE FOR INVESTMENT PROJECTS
GENERAL TECHNOLOGICAL INNOVATION PROGRAM
(AR-X1015)

<table>
<tr><th colspan="6">Financial Terms and Conditions</th></tr>
<tr><td colspan="3" rowspan="2">Borrower: Argentine Republic</td><td colspan="3">Flexible financing facility*</td></tr>
<tr><td colspan="2">Amortization period:</td><td>25 years</td></tr>
<tr><td colspan="3" rowspan="3">Executing agency: Ministry of Science, Technology, and Productive Innovation (MINCyT)</td><td colspan="2">Weighted average life:</td><td>15.25 years</td></tr>
<tr><td colspan="2">Disbursement period:</td><td>5 years</td></tr>
<tr><td colspan="2">Grace period:</td><td>5.5 years</td></tr>
<tr><td>Source</td><td>Amount</td><td>%</td><td colspan="2">Inspection and supervision fee:</td><td>**</td></tr>
<tr><td>IDB (Ordinary Capital):***</td><td>US$150 million</td><td>78.9</td><td colspan="2">Interest rate:</td><td>LIBOR-based</td></tr>
<tr><td>Local:</td><td>US$ 40 million</td><td>21.1</td><td colspan="2">Credit fee:</td><td>**</td></tr>
<tr><td>Total:</td><td>US$190 million</td><td>100</td><td colspan="2">Currency:</td><td>U.S. dollars from the Bank’s Ordinary Capital</td></tr>
<tr><th colspan="6">Project at a Glance</th></tr>
<tr><td colspan="6">Objective: The program’s general objective is to boost enterprise productivity by increasing investment in research, development, and innovation. The specific objectives are to: (i) increase the innovation capacity of enterprises; (ii) increase the generation of scientific and technological knowledge; and (iii) boost the capacity to monitor, evaluate, coordinate, and disseminate science, technology, and innovation policies.</td></tr>
<tr><td colspan="6">Special contractual conditions precedent to the first disbursement: Submission of evidence that the program’s Operating Regulations, previously agreed upon with the Bank, have taken effect will be a condition precedent to the first disbursement (paragraph 3.4).</td></tr>
<tr><td colspan="6">Special contractual execution conditions: All the terms and conditions of the open-ended and fixed-deadline calls for proposals envisaged in the program will have obtained the Bank’s prior no objection (paragraph 3.4).</td></tr>
<tr><td colspan="6">Exceptions to Bank policies: None.</td></tr>
<tr><td colspan="6">Project qualifies as: SEQ [ ] PTI [X] Sector [X] Geographic [ ] Headcount [ ]</td></tr>
</table>

* Under the Flexible Financing Facility (document FN-655-1), the borrower has the option of requesting changes to the amortization schedule, as well as currency and interest rate conversions. The Bank will take operational and risk management considerations into account when reviewing such requests.

** 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 applicable policies.

*** Disbursement of the loan proceeds will be subject to the following maximum limits: (i) up to 15% during the first 12 months; (ii) up to 30% during the first 24 months; and (iii) up to 50% during the first 36 months, all from the date of approval of the loan by the Bank’s Board of Executive Directors.

I. DESCRIPTION AND RESULTS MONITORING

A. Background, problems addressed, and rationale

1.1 Over the past two decades, the Bank has provided steady support for Argentina's public science, technology, and innovation (STI) policies, contributing to their sustainability and a sharper focus on results.[1] The most recent Bank support took place in a context of prioritization of STI, particularly the establishment of the Ministry of Science, Technology, and Productive Innovation (MINCyT) in 2007 and approval of the new strategic framework for the sector, the Plan Argentina Innovadora 2020 [2020 Innovative Argentina Plan].[2] The Conditional Credit Line for Investment Projects (CCLIP) agreed on by the country and the Bank in 2009 (Technological Innovation Program AR-X1015 for a total of US$750 million) and its first three projects (2180/OC-AR for US$100 million; 2437/OC-AR for US$200 million, and 2777/OC-AR for US$200 million) helped to consolidate MINCyT's role as coordinator of the Sistema Nacional de Innovación [national innovation system] (SNI) and promoted a series of improvements in STI policy, notably: (i) a gradual shift away from horizontal interventions toward technological efforts more closely targeted to strategic sectors; (ii) greater stress on systemic types of support for innovation, favoring linkages among firms, research centers, governments, and civil society; and (iii) recognition of the social impact of research and innovation activities.

1.2 The proposed program, the fourth under CCLIP AR-X1015, will prioritize the challenge of boosting the productivity of the productive sector. Recent studies have shown that Argentina is lagging behind the developed countries in productivity. Taking the United States as a proxy for the international technological frontier, Argentina's total factor productivity (TFP) compared to that frontier is 64%, a level that has remained more or less unchanged over the last two decades (Penn World Table 8.0, 2014). It is worth noting, however, that although productivity grew significantly in the last decade (at a rate of 4.5%, productivity has accounted for more than 60% of recent growth in GDP), this expansion has only been able to offset the drop in productivity in the second half of the 1990s. In this context, to successfully converge with the more advanced nations, it is crucial to make growth in productivity sustainable. Among the factors that limit productivity, the project will focus on those linked to knowledge and innovation,[3] including: (i) inadequate innovation capacity in enterprises; (ii) low production and dissemination of scientific and technological knowledge; and (iii) incipient capacity for STI policy monitoring and evaluation, institutional coordination, and dissemination. Other relevant factors, such as education, will not be addressed, since they are not the direct responsibility of MINCyT.

---

1 The Bank's activities in the science and technology (S&T) sector began in the 1960s with a loan (91/SF-AR) for US$1 million for the laboratories of the Comisión Nacional de Energía Atómica [National Atomic Energy Commission]. Since then, 10 other loans have been approved for a total of US$1.216 billon.

2 Plan Argentina Innovadora 2020. Lineamientos estratégicos 2012-2015 [strategic guidelines 2012-2015].

3 The Innovation, Science and Technology Sector Framework Document (document GN-2791-3) explains the relationship between knowledge, innovation, productivity, and economic development (pages 3 to 8). Crespi G. et al. (2014) presents evidence of the importance of knowledge and innovation for the diversification of production and the relationship between diversification and productivity.

1.3 **State of Argentine enterprises**. Argentine enterprises have insufficient innovation capacity which is linked to scant investments in research and development (R&D) and a disconnect between companies and research centers. Investment in R&D has grown in recent years, rising from 0.48% of GDP in 2009 to 0.60% in 2013.[4] Although these figures show progress, the country is still lagging behind the members of the Organization for Economic Cooperation and Development (OECD), who invest an average of 2.4% of GDP in R&D.[5] This means that in Argentina, investments in R&D have accounted for less than 10% of growth in productivity in recent years,[6] while the indicator in the developed countries is close to 70%.[7] Another difference with the OECD countries is the makeup of investment. While in Argentina just 20.7% comes from companies, in the OECD countries the figure is above 60%. To close this R&D gap, the country must continue the growth in R&D it has experienced in recent years, but with greater dynamism in its enterprises.

1.4 Higher investment in innovation, particularly in the case of small and medium-sized enterprises (SMEs)[8], would help them to achieve more innovations in products and processes and boost their productivity (Crespi, 2014). However, most Argentinian enterprises[9] make little effort to innovate. According to a recent survey,[10] 40% of manufacturing companies with more than 10 employees engage in no innovative activity and just 13% have a formal R&D area. On average, investment in internal R&D by enterprises is about 0.25% of sales, fluctuating between 0.15% for SMEs and 0.30% for large firms. These figures are substantially lower than for firms in the OECD countries, which invest more than 2% in R&D with respect to sales.[11] These low investments in innovation are associated with market failures caused by information assymetries between enterprises and financiers and with the difficulties faced by companies in appropriating all the benefits created by innovation, thus

---

4 MINCyT data.

5 OCDE data, Science Technology and Industry Outlook 2014.

6 This contribution is obtained by multiplying observed investment in R&D as percentage of GDP by the expected rate of social return from that investment, which for Argentina is an estimated 70%. This result is divided by the TFP growth rate over the last decade. See more details in Crespi G. et al. (2014).

7 When Finland and Korea had Argentina's current income level, their investments in R&D accounted for 40% of their productivity growth (IDB, 2015).

8 For purposes of this program, SMEs will be defined as companies whose total annual sales expressed in pesos (Arg$) do not exceed the values established by the Department of Small and Medium Enterprise. The current ceilings for the different sectors are: agriculture (Arg$54 million), industry and mining (Arg$183 million), commerce (Arg$250 million), services (US$63 million), and construction (US$84 million).

9 In 2013, 510,000 companies registered employees in the Social Security System: 2% of them were large, 5% medium-sized, 23% small, and the remaining 71% were microenterprises. Broken down by sector, 55% were in services, 33% in commerce, and the remaining 12% in manufacturing. In territorial terms, over 70% of the firms were located in the city of Buenos Aires and in the provinces of Buenos Aires, Córdoba, and Santa Fé. Data from the Employment and Business Dynamics Observatory of the Ministry of Labor, Employment, and Social Security.

10 MINCyT (2013), Preliminary results of the national employment dynamics and innovation survey.

11 R&D is also heavily concentrated: 50 of companies make 80% of investments. Although it has some highly innovative firms, the country does not have any that rank among the top 500 world investors in R&D. OCDE, Science Technology and Industry Outlook 2014.

providing a rationale for public policies such as those envisaged in the proposed program.[12]

1.5 Company innovative capacity, particularly in SMEs, would also be stronger if their innovation strategies were more collaborative, particularly with universities and R&D centers. However, according to the above-mentioned survey, just half of manufacturing companies have links to other agents to complement their innovative capacity (48% of SMEs and 75% of large firms). Furthermore, in most cases the links are with other companies and business associations, while there are fewer relations with R&D centers and universities (17.4% and 13%, respectively). The most frequent objectives of the linkages are short term (human resource training, testing, etc.), while objectives with longer horizons and impacts (R&D and industrial design) are less frequent. Addressing the institutional, coordination and management shortcomings that limit cooperation among firms and with R&D centers is the key to boosting entrepreneurial innovation, particularly in Argentina, where the greatest efforts in R&D are made by public R&D centers and universities.[13] Furthermore, increasing the opportunities for public-private cooperation could help to generate the public inputs required for the development of the strategic sectors prioritized in Plan Argentina Innovadora 2020 and other emerging sectors with high export potential, for example, aquaculture.

1.6 The production and dissemination of scientific and technological knowledge are limited owing to lack of human resources, specialized equipment, and multidisciplinary and cooperative working strategies. In recent years, the main public R&D centers and universities have increased their research staff and upgraded their infrastructure. The country's total number of full-time researchers rose from 32,222 in 2009 to 37,844 in 2013,[14] reaching close to three researchers per 1,000 members of the economically active population (EAP). They also made qualitative improvements by incorporating more young people and women into their research staff. However, a gap still exists in human resource capacity compared to the OECD countries. In Japan, the United States, Portugal, France, and Canada, the indicator for researchers per 1,000 EAP exceeds eight.[15] As for infrastructure, after an ambitious works plan was carried out,[16] the shortage of space for research was substantially reduced. Progress was also made with equipment, although additional investments are still required in this area to renew obsolete equipment and procure sophisticated equipment for new research areas.[17] Another area in which progress needs to be made is in tapping the

---

12 A detailed analysis of the market failures that discourage private investment in innovation can be found in document GN-2791-3.

13 Evidence suggests that participation by businesses in R&D projects is critical for removing barriers to cooperation (Eom and Lee, 2010) and increases the probability that institutional R&D linkages will be established (Falk, 2007; Busom and Fernandez-Ribas, 2008). Moreover, Cappelen et al. (2011) concludes that firms that cooperate with companies and R&D centers have a higher probability of being successful in their innovation and patenting activities.

14 Approximately 55% of researchers are in public and private universities, 35% in public agencies, and just 10% in enterprises.

15 MINCyT Science and Technology Indicators.

16 Between 2009 and 2014, 100,897 square meters were built. See further details in Plan de obras para la ciencia and la tecnología [Science and technology works plan]. Morón, V. et al. (2014). MINCyT.

17 For more information on equipment requirements see Diagnostic analysis of major equipment.

advantages of multidisciplinary research to solve complex problems. The convergence of different scientific disciplines provides opportunities to combine resources and share infrastructure for tackling common problems, which have not been seized as yet, due to failures of coordination and cooperation between R&D centers and universities.

1.7 Future investments in scientific capacity should focus on narrowing the gaps in productivity and knowledge creation. There has been an increase in scientific production in recent years. Between 2009 and 2013, publications reported in the Web of Science-Thomson Reuters database grew by 27%, rising from 8,355 to 10,650. This growth was comparable to the rate in other Latin American countries such as Brazil and Chile and even higher than in some OECD countries.[18] However, available evidence points to the existence of a gap in scientific productivity that reflects the shortages in human resources and equipment mentioned earlier and problems in the management of R&D. For example, while OECD countries such as the United States, Germany, France, and Portugal exhibit productivity, measured in the number of publications per full-time researcher, of more than 0.34, in Argentina's case, this indicator is 0.21. The country's relative shortfall is also apparent when looking at the number of publications in leading journals: Argentina has just 7.31 publications in journals in the upper quartile per US$1 million GDP, compared to an indicator in excess 30 for countries such as Australia, Canada, and the Republic of Korea. Furthermore, there are also difficulties in transforming knowledge into applications with a potential impact on industry, which can be seen in the small number of patents registered by Argentines in the country and internationally.[19]

1.8 For the SNI to continue consolidating, challenges associated with evaluation, institutional coordination, dissemination, and the value attributed to STI need to be addressed. As for the challenge of evaluating STI policies, MINCyT and the Agencia Nacional de Promoción Científica and Tecnológica [National Agency for the Promotion of Science and Technology] (ANPCyT) should provide continuity and consolidate the efforts they have been making in this field, paying special attention to the Centro de Estudios Interdisciplinarios de Ciencia and Tecnología [Center for Interdisciplinary Studies in Science and Technology] (CIECTI). As for coordination and strengthening of the stakeholders in the system to boost efficiency levels, although considerable progress has been made with the establishment of national systems for large equipment and databases, and the creation of the institutional evaluation program,[20] there is still room to increase their

---

[18] This performance is consistent with the study by Juárez Micó, M. (2014) who reports an increase in the number of Argentine authors contributing to the mainstream in international science.

[19] Argentine patent applications have remained stable, with about 5,000 registered each year. Furthermore, the share of resident applications does not exceed 15%. Nonetheless, the number of biotechnology patents has nearly quadrupled, reflecting MINCyT's investment in this area. MINCyT.

[20] National large equipment systems and databases seek to make more efficient use of that equipment and improve the organization of and access to scientific databases in different science and technology institutions throughout the county. Between 2009 and 2014, 14 national systems were established that enable users to access more than 300 pieces of major equipment. The Programa de Evaluación Institucional (PEI) [institutional evaluation program] promotes ongoing evaluation and continuous improvement of the agencies that belong to the national STI system. Between 2009 and 2014, 38 stakeholders in the science and technology system participated in PEI-MINCyT.

coverage in both cases. Lastly, with respect to the dissemination of STI policies and social recognition of their value, MINCyT needs to step up its communication efforts to encourage more companies to use the promotional instruments and to improve the positioning of science and innovation in society and in companies. A recent survey[21] indicates that the public perceives shortfalls in national science and technology research capacity and believes that public funding is still insufficient. Furthermore, the public is not familiar with local STI institutions and there is a vocational deficit among young people in pursuing science and technology careers.

1.9 **Prior Bank interventions**. Three operations were approved under CCLIP AR-X1015 whose financial status, outputs, and outcomes are summarized below. The Technological Innovation Program I (TIP I) (loan 2180/OC-AR) was approved in 2009, with Bank financing of US$100 million. It has been fully executed. The main achievements were: (i) a mechanism was put in place to select and finance, through nonreimbursable contributions, medium-term high-impact technological innovation projects in the areas of sustainable energy, health, agroindustry, and the social sectors. Four of those projects have concluded and the expected sector technological targets were attained, bringing positive economic and social benefits;[22] (ii) nonreimbursable contributions were granted to 280 firms for technology development projects and loans were made to 51 firms for technology upgrading projects. An impact evaluation using quasiexperimental techniques points to improvements in the performance of the beneficiary companies and, through labor mobility, in the performance of nonbeneficiary firms as well.[23] These externalities account for 20% in terms of job creation and 5% in terms of export potential in Argentina; (iii) nonreimbursable contributions were granted to 2,494 groups of researchers for science and technology research projects, which led to an improvement in their scientific production compared to nonbeneficiaries;[24] (iv) seventy-three projects were funded for the repatriation of researchers to local universities and R&D centers; and (v) fourteen new buildings were constructed, one devoted to STI administration (phase one of the Science and Technology Complex, refurbishing the historical building formerly belonging to the GIOL winery) and 13 devoted to R&D, which enabled an improvement in the performance of the researchers and grant recipients who work in them.[25]

1.10 The Technological Innovation Program II (TIP II) (loan 2437/OC-AR) was approved in 2010, with Bank financing of US$200 million (86% disbursed with closing

---

21 Third National Survey of the Public Perception of Science (2013), MINCyT.

22 Wasilevsky, I. (2015), Análisis de beneficios económicos de proyectos financiados con Fondos para la Innovación Tecnológica Sectorial [Analysis of the economic benefits of projects financed with sector technological innovation funds]. Consultant's report.

23 Castillo, V. et al. (2014), Knowledge Spillovers of Innovation Policy through Labor Mobility: An Impact Evaluation of the FONTAR Program in Argentina. IDB Working Paper Series IDB-WP-488.

24 Arza, V. and Vázquez, C. (2014), Valoración del diferencial de aumento en producción científica en investigadores apoyados por Proyectos de Investigación Científica and Tecnológica (PICT) y PEA vs grupo de control [Assessment of the differential increase in scientific production by researchers supported by science and technology research projects and EAP compared to a control group]. Consultant's report.

25 Vaccarezza, L. (2013) Informe de evaluación de los primeros resultados de las obras por el Plan Federal de Infraestructura para Unidades de investigación dependientes del CONICET [Evaluation of the initial results of the federal infrastructure plan for research units under CONICET]. Consultant's report.

expected in October 2015) and TIP III was approved in 2013 (loan 2777/OC-AR) with similar financing (US$200 million), which is 60% disbursed. The outputs obtained to date are: (i) more than 40 medium-term technological innovation projects with high sector impact were undertaken, with emphasis on the provinces lagging farthest behind; (ii) technology development projects were implemented in 900 companies; (iii) innovation processes were promoted in 10 productive clusters and seven value chains; (iv) fifty-seven Ph.D.s were hired by companies; (v) seven private entities that provide technology services to SMEs were strengthened; (vi) science and technology research projects are being developed by 3,000 groups of researchers; (vii) nine platforms with robust equipment for R&D were established; (viii) thirteen new buildings were financed, one for STI administration (second and third phases of the Science and Technology Complex) and 12 used for R&D; (ix) the process of institutional evaluation was supported in 40 STI institutions; (x) fourteen national major equipment systems and databases were established (which were joined by 192 R&D institutions); (xi) thirteen technology transfer offices were strengthened; and (xii) CIECTI was designed and started up.

1.11 **Eligibility of the operation.** The program meets the requirements to be part of CCLIP AR-X1015, in accordance with the Bank's policy established in the Proposed Modifications to the Conditional Credit Line for Investment Projects (CCLIP) (document GN-2246-4), in particular: (i) it is included in the 2015 Operationa Program Report (document GN-2805); (ii) it maintains the same executing agency as the earlier operations; (iii) commitments in excess of 75% and disbursements of more than 50% have been verified in the earlier operations; and (iv) the borrower and the executing agency have fulfilled the conditions of the earlier loan contracts, the Bank's disbursement and procurement policies, and the requirement to submit audited financial statements.

1.12 **Lessons learned**. A series of lessons learned from the previous operations under CCLIP AR-X1015[26] have been taken into account in designing the proposed program, particularly: (i) the evaluations of the instruments for supporting individual innovation and research projects point to favorable results, and therefore financing for them will be continued in the proposed operation to expand their coverage; (ii) in the case of support for innovation projects, one challenge identified was to increase the number of companies using this instrument for the first time, which has been reflected in Component I of the proposed program; (iii) with respect to the research projects, it is important to promote greater use of the knowledge they produce, to which end a new instrument to has been developed to support R&D projects carried out with companies; and (iv) lastly, the sector and regional technological innovation funds set up under the earlier operations have proven to be effective in stimulating collaborative efforts aimed at the development of high-impact innovations that require long implementation periods and a more painstaking economic analysis. The proposed program will provide continuity for those efforts and stress the performance of periodic economic studies.

[26] The outputs, achievements, and impacts of TIP I, II and III, and the lessons learned are documented in the semiannual reports submitted by MINCyT to the Bank (available in the technical files) and in nine external consultant's reports verifying the targets associated with disbursements for TIP I and II (see References to verification reports on outputs, outcomes, and impacts of the programs TIP I and TIP II).

1.13 **Program strategy and rationale**. This program will provide continuity for the interventions under CCLIP AR-X1015, which are expected to be completed with a future fifth and final operation. The program's strategy is based on a systemic approach to promoting innovation as a tool for raising the productivity levels of the productive sector, and on increased selectivity in investments. The systemic approach involves simultaneous interventions to narrow the investment gaps in innovative activities in companies (Component I) and knowledge production (Component II) and to increase the value attributed to science, technology, and innovation activities by society (Component III). In turn, this approach is based on the demand for or capacity to absorb program funds by companies, researchers, and public-private partnerships.[27] With regard to selectivity, a growing percentage of program funds is expected to be targeted to sector and regional problems and opportunities that have been identified in participatory processes, with expert validation carried out in the framework of the implementation panels of the 38 strategic socioproductive hubs identified in Plan Argentina Innovadora 2020.

1.14 **Strategic alignment.** The operation is consistent with development of the Argentine private sector, which is a priority area in the Bank's country strategy for 2012-2015 (document GN-2687), whose objectives include boosting the capacity for entrepreneurial innovation and knowledge transfers to increase the productivity of SMEs. The program will contribute to the financing priority of the Report on the Ninth General Increase in the Resources of the Inter-American Development Bank (GCI-9) (document AB-2764) of poverty reduction and equity enhancement through support for SMEs. It will also contribute to the output, financing for small and medium-sized enterprises, defined in the results framework. At the same time, the program is aligned with the Sector Strategy Institutions for Growth and Social Welfare (document GN-2587-2) that establishes one of the priorities as enhancing productivity by building institutional capacity to implement innovation policies. Lastly, the program is consistent with the Innovation, Science, and Technology Framework Document (document GN-2791-3), in particular with respect to increased investment in STI and adequate financing for business innovation.

B. Objectives, components, and costs

1.15 **Objectives.** The program's general objective is to boost enterprise productivity by increasing investment in research, development, and innovation. The specific objectives are to: (i) increase the innovation capacity of enterprises; (ii) increase the generation of scientific and technological knowledge; and (iii) boost the capacity to monitor, evaluate, coordinate, and disseminate science, technology, and innovation policies.

1.16 **Component I. Strengthening of technological innovation capacity (US$86 million).** The objective is to increase the innovation capacity of enterprises

[27] See Demand for support for innovation and research, which includes information on demand by companies, researchers and public-private partnerships for MINCyT tools to promote research and innovation. For example, between 2010 and 2014, an annual average of 600 companies submitted individual proposals for innovation projects (costing about US$100,000 each) and an annual average of 2,500 researchers submitted proposals for research projects (US$60,000 each). As for projects targeted to sector and regional problems and opportunities, between 2010 and 2014, more than 310 associations involving companies and R&D centers submitted proposals for sector technological innovation (average cost of US$3 million each).

through four lines of support which are summarized below and described in detail in the program Operating Regulations.

1.17 **Line 1. Innovation efforts by individual enterprises.** Two types of projects will be financed. The first will consist of entrepreneurial innovation projects that include activities such as: (i) technological research and development; (ii) development of technologies for cleaner production; (iii) creation of internal R&D units; (iv) intellectual property management; and (v) technical assistance. These projects should lead to innovations in products or processes that are national in scope and will be directed exclusively to SMEs. The second type will be projects to incorporate Ph.D.s in companies (preferably SMEs) to initiate and carry out R&D or similar activities inside these enterprises. Both types will be financed through nonreimbursable contributions of up to 80% of the project cost, with a maximum of US$250,000 for type one, and US$60,000 for type two. It is expected that by the end of the program at least 60% of these projects will be implemented by enterprises not previously assisted by the Fondo Tecnológico Argentino [Argentine Technology Fund] (FONTAR). The projects will be evaluated by experts on the basis of feasibility and technological quality, capacity of the applicant company, and economic viability. Projects selected on the basis of those criteria will be eligible for financing through fixed-deadline and open-ended calls for proposals announced by FONTAR since 2014.

1.18 **Line 2. Collaborative innovation efforts.** Two types of projects will be financed. The first is intended to boost investment in innovative processes carried out by productive clusters of enterprises, preferably SMEs, R&D centers, and R&D technology service centers. The objective of the second type is to improve the technological performance and productivity of SMEs that are suppliers or clients of a lead company in the same value chain. For both types, complementary technical assistance, R&D activities, and equipment will be financed through grants and loans for a maximum of US$4 million for the first type and US$1 million for the second. The projects will be evaluated by experts with international experience on the basis of feasibility and technological quality, collaborative capacity of the applicants, and economic viability. Projects selected on the basis of those criteria will be eligible for financing through fixed-deadline and open-ended calls for proposals announced by FONTAR since 2013.

1.19 **Line 3. Technological services.** Two types of projects will be financed. The first will be to strengthen technology services targeting SMEs, such as metrology and certification, engineering, product and process design, training in new technologies, etc. The beneficiaries will be institutions or companies with past experience in providing such services. The second type will be projects to establish technology services centers to address the unmet needs of enterprise clusters proposed by public-private or public-public partnerships. The projects will be supported through nonreimbursable contributions that will cover up to 80% of their total cost, for a maximum of US$1.5 million for the first type and US$2.5 million for the second. The projects will be evaluated by experts on the basis of feasibility and technological quality, execution capacity, financial viability, and economic impact and sustainability. Projects selected on the basis of those criteria will be eligible for financing through fixed-deadline and open-ended calls for proposals announced by FONTAR since 2014.

1.20 **Line 4. Innovations with high sector and regional impact.** Two types of projects will be financed. The first will consist of technological innovation projects with high sector and regional impact, to be developed by public-private partnerships composed of companies, R&D centers, and universities, with the goal of developing technological capacity and innovations to solve problems in the agroindustry, renewable energy, environmental, health, social development, and industrial sectors. These projects will be evaluated by international experts based on technological merit, the partnership's execution capacity, financial viability, and economic impact and sustainability. Projects selected by the Fondo Argentino Sectorial [Argentine Sector Fund] (FONARSEC) in public calls for proposals announced since 2013 including an updated economic analyses will be eligible for financing.[28] The second type will be technology projects to develop emerging sectors. These sectors will be distinguished by high global demand and high local development potential that is limited by shortages of public inputs stemming from inadequate public-private coordination. Support for these projects will include: (i) contracting of a technical team for project formulation and management, which will have the support of a public-private technical council for each sector, made up of representatives from the public and private sectors and from academic and technological institutions;[29] (ii) studies to identify missing public inputs that limit the development of the emerging sector and define and validate the development strategy; (iii) provision of specific public inputs to facilitate emergence of the sector (such as laboratories, training, human-capital mobility, technology centers, applied R&D programs, etc.); and (iv) pilot entrepreneurial projects on the various links of the sector's value chain that will reduce market risks and generate externalities involving information for the rest of the sector.[30] The plan is to finance at least two emerging sectors. Both types of projects will be financed through nonreimbursable contributions of up to 60% of their total cost, with a maximum of US$10 million and a minimum of US$400,000.

1.21 **Component II. Strengthening of science and technology research capacity (US$86 million).** The objective of this component is to promote the creation of new scientific and technological knowledge and its application to the productive sector and society. Three supplementary lines of support will be financed, which are summarized below and presented in detail in the program's Operating Regulations.

1.22 **Line 1. Science and technology research.** Two types of projects will be financed. The first will be science and technology research projects that will offer support for public and private not-for-profit research institutions in generating new knowledge. These projects will be selected through public calls for proposals directed to the following categories of projects: (i) open to all science and technology areas; (ii) aimed at solving regional problems; (iii) aimed at developing new technological skills in the goods and services market; (iv) interdisciplinary

---

[28] See the details in the Tentative list of technological innovation projects with high sector and regional impact to be financed by the program.

[29] These councils will provide strategic guidance for the management team, facilitate public and private coordination, and approve the development strategy for the emerging sector and each of the activities to provide public inputs and entrepreneurial pilot projects to be financed by the program.

[30] One example of an emerging sector that MINCyT has already identified for support is the aquaculture program. For more details see Foundations for the strategic aquaculture project.

projects in consolidated scientific areas; and (v) aimed at national emergencies. These projects will be evaluated by peer researchers and expert panels, based on scientific merit, the capacity of the researchers, and the sustainability and consolidation of the proposing institutions. Projects selected by the Fondo para la Investigación Científica and Tecnológica [Science and Technology Research Fund] (FONCyT) in accordance with the aforementioned criteria, in public calls for submissions announced since 2014 will be eligible for financing. The second type will be R&D projects agreed upon with companies that seek to develop a strategic collaborative effort between a company and a set of research groups belonging to one or more beneficiary institutions, which will carry out R&D activities in response to the priorities and quality standards proposed by the company. The evaluation will be performed in two phases. In the first, the company's project idea will be analyzed from the standpoints of technical quality, commitment, and impact, and in the second, the projects presented by researchers will be analyzed from the standpoint of the specific criteria established in calls for proposals made in response to the project ideas of companies. Support will consist of nonreimbursable contributions of up to 50% of the project cost, with a maximum of US$400,000 per research project and US$1 million per company (the sum of the research projects associated with a company).

1.23 **Line 2. Upgrading of scientific and technological equipment**. Projects to enhance the capacity of laboratories or R&D centers belonging to public and not-for-profit private institutions will be financed through the purchase and installation of major scientific and technological equipment within the framework of the country systems. Support will consist of nonreimbursable contributions of up to 75% of the cost of the project, with a maximum of US$1.5 million. Evaluation and selection will be done by an ad hoc panel composed of international experts called by FONCyT and national experts called by MINCyT's Office of the Deputy Secretary for Institutional Coordination.

1.24 **Line 3. Multidisciplinary interagency research centers.** Projects presenting proposals for collaborative multidisciplinary research for the creation and/or consolidation of a research center of excellence, in which at least three sponsoring scientific or technological institutions participate will be financed. The centers should aim to address local or sector problems, and their research and human-resource training strategies should be multidisciplinary. Special emphasis will be placed on the centers' governance structure and their sustainability plans. Support will consist of nonreimbursable contributions of up to 80% of the total cost of the project, with a maximum of US$2.5 million and a duration of up to five years. Selection will be through an open-ended call and each proposal will be evaluated by a panel of national and international external evaluators. The nonreimbursable contributions will be disbursed annually against fulfillment of output milestones. Each center will undergo a midterm international evaluation (30 months after it begins operating). To ensure good governance, MINCyT will appoint a representative to each center's governing council in the setup phase.

1.25 **Component III. Monitoring, evaluation, institutional coordination, and dissemination of STI (US$12 million).** The following activities will be financed: (i) surveys and polls to prepare STI indicators; (ii) studies, training, and dissemination activities to be carried out under an agreement between MINCyT

and CIECTI on the following subjects: results and impact evaluations of the promotional instruments, good international practices, innovative behavior of the companies, analysis of sectors and technologies, and monitoring and evaluation of the national STI plan, etc.; (iii) projects involving training, technical assistance, and minor equipment to continue strengthening the national major equipment systems and databases; (iv) self-evaluations, evaluations, preparation and implementation of improvement plans under the institutional evaluation program for science and technology institutions; and (v) development and implementation of a strategy for STI dissemination and communication that includes financing for projects to promote a scientific culture, production and procurement of multimedia content, and workshops, fairs, and other dissemination activities linked to the Science Cultural Center and the National Innovation Competition (INNOVAR).

C. Key results indicators

1.26 **Expected impacts, outcomes, and outputs.** The program will generate positive impacts on enterprise productivity. The following outcomes are expected, in line with those impacts: (i) an increase in investment in innovation and R&D by the beneficiary enterprises compared to a control group and in the degree of collaboration between the companies and R&D centers that received support; (ii) higher production of knowledge by the beneficiary researchers compared to a control group, an increase in the number of scientific teams managed cooperatively, and an increase in the number of multidisciplinary and interagency knowledge outputs; and (iii) the availability of studies and evaluations that contribute to the design of instruments and policies to promote STI, an improvement in the managerial and planning capacity of R&D institutions, and greater participation in the program by enterprises as a result of the dissemination strategy. Prominent among the expected outputs is the support for individuals and productive units to boost their competitiveness and innovation. In addition, certain output indicators will be tracked by gender (see the Results Matrix in Annex II).

1.27 **Economic evaluation.** The program is expected to bring high social returns thanks to an increase in the productivity of approximately 700 SMEs that will receive support. The program's estimated net present value (NPV) on the aggregate level is US$181 million and the internal rate of return (IRR) is 25%. The scenario without the project was considered implicitly in the economic analysis, using parameters taken from impact evaluations. The evaluation horizon was 10 years with a discount rate of 12%. The benefits were estimated in a conservative scenario. A cost-benefit analysis was performed for each component and was favorable in all cases. The sensitivity analysis indicates that the most volatile parameters are the increase in productivity, the average productivity level of the companies, the success rate of projects in science and technology, and their average amount, the social discount rate, and the social return on innovation. The level of certainty of the NPV results in both components is high (see the economic evaluation).

II. FINANCING STRUCTURE AND MAIN RISKS

A. Financing instruments

2.1 This program is the fourth operation under CCLIP AR-X1015, which was approved in 2009. The program's total cost is US$190 million, of which US$150 million will be financed from the Bank's Ordinary Capital and US$40 million from the local contribution. The disbursement period will be five years. The budget broken down by component and source is presented in Table 1 and in the Itemized Budget.

2.2 The Bank's financing will be disbursed as shown in Table 2. As established in the document Enhancing Macroeconomic Safeguards at the Inter-American Development Bank (document AB-2990), disbursements of Bank financing will be subject to the following maximum limits: (i) up to 15% during the first 12 months; (ii) up to 30% during the first 24 months; and (iii) up to 50% during the first 36 months, as of the date on which the Board of Executive Directors approves the loan. These limits may be inapplicable, depending on compliance with related requirements under Bank policy, provided the borrower has been notified in writing in advance.

Table 1. Program cost (in US$ millions)

Component	IDB	LOCAL	TOTAL	%
Component I: Strengthening of technological innovation capacity	**75.0**	**11.0**	**86**	**45.3**
Innovation efforts by individual companies	18.3	3.0	21.3	11.2
Collaborative innovation efforts	9.0	1.0	10.0	5.3
Technological services	5.7	1.0	6.7	3.5
Innovations with high sector and regional impact	42.0	6.0	48.0	25.2
Component II: Strengthening of science and technology research capacity	**66.0**	**20.0**	**86.0**	**45.3**
Science and technology research	36.0	18.0	54.0	28.4
Upgrading of scientific and technological equipment	20.0	2.0	22.0	11.6
Multidisciplinary interagency research centers	10.0	-	10.0	5.3
Component III: Monitoring, evaluation, institutional coordination, and dissemination of STI	**3.5**	**8.5**	**12.0**	**6.2**
Surveys and polls	0.5	0.5	1.0	0.5
Studies, training, and other CIECTI activities	1.2	1.0	2.2	1.1
National systems and institutional evaluation	-	6.0	6.0	3.1
STI dissemination and communication strategy	1.8	1.0	2.8	1.5
Administration, evaluation, and audits	**5.5**	**0.5**	**6**	**3.2**
TOTAL	**150.0**	**40.0**	**190.0**	**100.0**

Table 2. Disbursement schedule (US$ millions)

Financing/year	1	2	3	4	5	TOTAL
IDB	22.5	22.5	30	37.5	37.5	**150.0**
%	**15**	**15**	**20**	**25**	**25**	**100**

B. Environmental and social risks

2.3 In accordance with the Directive B.13 of the Environment and Safeguards Compliance Policy (Operational Policy OP-703), and based on the results of the Safeguards Policy Filter, this operations requires no classification. There are no environmental or social risks associated with this project.

C. Technical and fiduciary risks

2.4 A risk management workshop was held during the analysis mission attended by teams from MINCyT, ANPCyT, and the Bank. It concluded that the level of risk is medium.

2.5 **Technical risks.** Nine technical risks were identified—one high, five medium, and three low. The high risk is slow implementation of the strategic projects for the development of emerging sectors. To mitigate that risk, a public-private council will be established per sector that will monitor and provide strategic guidance, and facilitate public and private coordination. The medium risks are: (i) the world economy may dampen demand by companies for financial support for innovation projects, which will be mitigated through an alternative, countercyclical design of development instruments; (ii) the priority of STI in public policies may be reduced, which will be mitigated through the administration by MINCyT of multiyear sources of financing and the performance of impact evaluations to demonstrate the interventions' effectiveness; (iii) difficulties in governance may affect the start-up and sustainability of the multidisciplinary interagency research centers, which will be mitigated by strengthening governance with the inclusion of MINCyT representatives; (iv) interagency problems may stand in the way of compiling STI indicators, which will be mitigated through the drafting and signature of specific cooperation agreements; and (v) there is no coordination between the program and other complementary productive development initiatives financed by the Bank in the country, which will be mitigated through periodic workshops for the executing agencies.

2.6 **Fiduciary risks.** The two fiduciary risks are medium. The first is the obsolescence of ANPCyT's financial information system, which will be mitigated through a study of alternatives to improve the system, to be conducted by ANPCyT. The second is the lack of flexibility of the program's financial information system, to be mitigated by intensifying an improvement plan that has already been agreed on with the Bank and is being implemented under CCLIP AR-X1015.

2.7 **Sustainability.** As in earlier operations, the program's planned interventions, particularly those associated with new instruments (strategic projects, R&D projects coordinated with companies, multidisciplinary interagency centers) are expected to be sustained over time through the institutional capacity built up in the executing agency and in the users, and the demonstration effects. Impact evaluations will be conducted using quantitative and qualitative techniques to demonstrate the validity of the interventions. The outlook is that the instruments proven to be effective will be scaled up or sustained with national resources, as has already been done in the past. Over the period 2009-2013, public investment in R&D grew by 207% and private investment by 172%. Lastly, it is important to note that there is a broad consesnus regarding the relevance and the outcomes

achieved with recent STI support programs, and thus, a scenario in which public and private investment grows in the sector is considered probable.

III. IMPLEMENTATION AND MANAGEMENT PLAN

A. Summary of implementation arrangements

3.1 **Borrower and executing agency**. The borrower will be the Argentine Republic and the executing agency will be the Ministry of Science, Technology, and Productive Innovation (MINCyT).

3.2 MINCyT will delegate certain activities to ANPCyT. Both MINCyT and ANPCyT have extensive experience in executing Bank-financed programs. Through its funds (FONTAR, FONCyT, and FONARSEC), ANPCyT will be responsible for: (i) announcing fix-deadline and open-ended calls for proposals; (ii) advising the beneficiaries; (iii) coordinating evaluations of proposals submitted by beneficiaries; (iv) formalizing contracts for the transfer of funds to the beneficiaries (subexecuting agencies); and (v) monitoring the projects financed. All projects will be evaluated by panels of experts in each of the program's lines and their approval will be the responsibility of ANPCyT's board, except in the case of the projects for multidisciplinary interagency centers, which will be approved by MINCyT. All open-ended and fixed-deadline calls to select beneficiaries will be regulated through terms and conditions consistent with the program's Operating Regulations. Fiduciary management will be the responsibility of ANPCyT's Externally-financed Projects Office.

3.3 **Fiduciary agreements and requirements.** Loan proceeds may be disbursed as advances of funds, reimbursements of expenditures, or direct payments to suppliers. For advances, disbursements will be based on projected expenditures for up to 180 days. The minimum percentage required to replenish the advanced funds will be 70%, since the program is decentralized and its execution is complex (ongoing flexibility). Financial management will be carried out through the EMERIX system, which has already been used in the earlier operations. The executing agency will submit the program's audited financial statements each year, as required under Bank policies. The procurement plan will be managed through the online electronic system known as the Procurement Plan Execution System (SEPA). Procurement of works and goods and the contracting of consulting services will be carried out in accordance with the Policies for the procurement of works and goods financed by the IDB (document GN-2349-9) and the Policies for selection and contracting of consultants financed by the IDB (document GN-2350-9), both of March 2011, or subsequent updates. ANPCyT consultants who have provided satisfactory services under the earlier loans may be contracted through direct selection, by virtue of continuity of service (see Annex III, Fiduciary Agreements and Requirements).

3.4 **Submission of evidence that the program's Operating Regulations, previously agreed on with the Bank, have taken effect will be a condition precedent to the first disbursement.** Special execution condition: All the terms and conditions of the open-ended and fixed-deadline calls for proposals envisaged in the program will have obtained the Bank's prior no objection.

3.5 **Retroactive financing and recognition of expenditures.** Retroactive financing will not be used.

B. Summary of results monitoring arrangements

3.6 The program will be monitored by ANPCyT's Evaluation and Quality Assurance Unit (UEAC). MINCyT, through ANPCyT, will submit semiannual reports to the Bank on the status of the midterm output and outcome indicators established in Annex II (Results Matrix) and the Monitoring and evaluation plan. The reports for the second half of each year will include an annual work plan and a review of the targets for the remainder of the program.

3.7 **Evaluation.** The program evaluation will be coordinated by the UEAC, following the guidelines established in the monitoring and evaluation plan. A final evaluation will be performed when 95% of the loan proceeds have been disbursed. The final evaluation report will have the following main objectives: (i) verify the extent to which the indicators for the general program objectives were attained; (ii) evaluate the degree to which the different components and instruments were executed in comparison with the targets established in the Results Matrix; and (iii) identify lessons learned that can be applied in future projects. The final evaluation will combine qualitative and quantitative methods. The latter will be based on quasiexperimental techniques, such as difference in differences with statistical pairing in the baseline, and regression discontinuity.

Development Effectiveness Matrix			
Summary			
I. Strategic Alignment			
1. IDB Strategic Development Objectives	**Aligned**		
Lending Program	**-Lending for poverty reduction and equity enhancement**		
Regional Development Goals			
Bank Output Contribution (as defined in Results Framework of IDB-9)	**-Micro/small/medium productive enterprises financed**		
2. Country Strategy Development Objectives	**Aligned**		
Country Strategy Results Matrix	**GN-2687**	**Increase in business innovation capacities, knowledge transfer and increased productivity for SMEs.**	
Country Program Results Matrix	**GN-2805**	**The intervention is included in the 2015 Operational Program.**	
Relevance of this project to country development challenges (If not aligned to country strategy or country program)			
II. Development Outcomes - Evaluability	**Evaluable**	**Weight**	**Maximum Score**
	8.7		**10**
3. Evidence-based Assessment & Solution	**9.4**	**33.33%**	**10**
3.1 Program Diagnosis	**2.4**		
3.2 Proposed Interventions or Solutions	**4.0**		
3.3 Results Matrix Quality	**3.0**		
4. Ex ante Economic Analysis	**7.0**	**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	**0.0**		
4.5 Sensitivity Analysis	**0.0**		
5. Monitoring and Evaluation	**9.7**	**33.33%**	**10**
5.1 Monitoring Mechanisms	**2.5**		
5.2 Evaluation Plan	**7.2**		
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/FMP Criteria)	**Yes**	**Financial Management: Budget, External control, Internal Audit.**	
Non-Fiduciary			
The IDB's involvement promotes additional 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	**Yes**	**Fourth operation of a CCLIP. The Bank provided technical assistance to the Executing Agency in previous operations of the series. In particular, AR-T1076 for US$500.000 supported the national agency for science and technology in managing and monitoring innovation indicators.**	
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**	**Non-experimental methods will be used in the proposed impact evaluation to answer, among others, the following questions: i) have the program´s subsidies leveraged investments in innovation actitivities of the beneficiary firms?; ii) have the program´s subsidies been effective in generating innovations (improving or developing new products or services)?; iii) have these innovations contributed to improving the performance of the firms, sectors and regions supported?**	

The "Program of Technological Innovation IV" (AR-L1181) is the fourth individual operation of the conditional credit line for investment projects AR-X1015. The objective of the program is to improve the productivity of firms, increasing investment in research, development, and innovation. In particular, the program aims to: (i) increase firms' innovation capacities; (ii) increase the generation of scientific knowledge; and (iii) improve the capabilities for follow-up, evaluation, articulation, and dissemination of the policies for Science, Technology, and Innovation (CTI).

The vertical logic of the program is clearly stated: the diagnosis is low productivity caused by limitations on the demand side (lack of innovation, lack of knowledge generation, lack of association and coordination amongst productive units and centers of generation of Research and Development (R&D)), as well as limitations on the supply side (lack of infrastructure). The activities and outputs aim at addressing these factors: incentivize investment and innovation in firms; promote associativity for innovation; finance R&D and modernize equipment; create multidisciplinary centers of R&D; articulate centers of R&D, etc. The proposed outcome indicators consistently permit monitoring and evaluating the achievement of the objectives thanks to the investment.

The economic analysis suggests positive net benefits, which operate through improvements in the productivity of participating firms (a 15% increase in productivity due to program participation is suggested, based on evidence from similar programs) and positive externalities and indirect benefits towards non-participants. It is worth noting the differential effect for new-entrant firms and incumbent firms. The latter with larger elasticities, due to learning and the experience from participation in earlier programs. The sensitivity analysis shows high probability of positive social returns even under scenarios of drastic variation in the most relevant parameters of the simulation (for example, the probability of success of participating projects). Nevertheless, the clarification of the mechanisms of the estimation and the relationship amongst variables and parameters remains pending; such clarification would allow a better understanding of the simulation process and the origin of the reported results.

The evaluation plan proposes measuring the impacts on the main outcome indicators through the use of non-experimental methodologies such as propensity-score matching, difference-in-difference, and regression discontinuity. Similarly, it proposes measuring indirect effects by linking indirect beneficiaries based on geographic proximity or labor mobility. Regarding the measurement of both direct and indirect benefits, questions remain about the sufficiency of the available sample sizes of comparable control units, which are needed to obtain the counterfactual scenario.

RESULTS MATRIX

General and specific objectives:	The program's general objective is to boost enterprise productivity by increasing investment in research, development, and innovation. The specific objectives are to: (i) increase the innovation capacity of enterprises; (ii) increase the generation of scientific and technological knowledge; and (iii) boost the capacity to monitor, evaluate, coordinate, and disseminate science, technology, and innovation policies.

IMPACT INDICATORS

	Impact	Unit of measure	Baseline	Target 2020	Means of verification/comments
1	Difference in the productivity of beneficiary companies compared to a control group	Percentage	0	12	Study based on the results of the FONTAR innovation survey of beneficiary companies and a control group (unsuccessful applicant companies). Baseline: National Employment and Innovation Pilot Survey (ENDEI) US$268,000 (average 2009-2011).

OUTCOME INDICATORS

	Indicator	Unit of measure	Baseline	Target 2020	Means of verification/comments
	Specific objective I: Increase innovation capacity				
2	Investment in innovation in the beneficiary companies compared to a control group	Percentage	0	40	Calculated as the change in the innovation investment-to-sales ratio in the beneficiary companies, less the change in the innovation investment-to-sales ratio in the control companies (%). Baseline: 1.9% investment in innovation with respect to sales (data on companies that submitted projects to FONTAR). Source: FONTAR and innovation surveys.
3	Intensity of R&D in spending on innovation by the beneficiary companies compared to a control group	Percentage	0	15	Calculated as the change in the R&D investment-to-total innovation investment ratio in beneficiary companies less the change in the R&D investment-to-total-innovation investment ratio in the control companies (%). Baseline: 18% (data on companies that submitted projects to FONTAR). Source: FONTAR and innovation surveys.
4	Companies participating in public-private partnerships that continue their linkage to R&D centers	Percentage	0	30	Calculated as the percentage of companies that participate in partnerships that maintain links involving consultations, exchanges of technical information, or similar ties with R&D centers six months after the end of the project out of the total number of companies that participate in partnerships. Source: Specific survey of companies that participated in public-private partnerships.

	Indicator	Unit of measure	Baseline	Target 2020	Means of verification/comments
	Specific objective II: Increase the generation of scientific and technological knowledge				
5	Annual production of knowledge by beneficiary researchers compared to a control group	Scientific articles	0	1.3	Calculated as the difference in the annual number of scientific publications in internationally-indexed journals published by beneficiary researchers less those of the control group. Source: Specific study based on Scopus.
6	Scientific equipment used cooperatively	Equipment	330	400	Calculated as all the scientific equipment registered in national major equipment systems. Source: National major equipment systems.
7	Interdisciplinary cooperative knowledge products implemented	Knowledge products	0	6	Outputs produced in interagency centers. Includes joint publications and technical reports (coauthored), training programs carried out, and extension and transfer activities. Source: Specific study based on center data.
	Specific objective III: Boost the capacity to monitor, evaluate, coordinate, and disseminate science, technology, and innovation policies				
8	CIECTI studies used as inputs in the design of policies, plans, and programs and in changes in the design of instruments	Percentage	0	50%	Evaluated through an external report that includes a documentary search and interviews with stakeholders in charge of policy formulation, and the design and execution of specific instruments. The target is 78 studies. Source: Specific study and CIECTI web page.
9	Difference in R&D planning and management capacity between institutions that participated in the institutional evaluation program compared to a control group	Percentage	0	30%	Calculated as the difference in R&D planning and management capacity between the institutions that were involved in all stages of the institutional evaluation program (self-diagnosis, external evaluation, and preparation and implementation of an improvement plan) and the institutions that only completed the first two stages (self-diagnosis and external evaluation). Source: Specific study based on external evaluations of participating institutions and closing reports on the improvement plans.
10	Companies that participate in the program as a result of information obtained through one of the tools developed in the communication strategy.	Percentage	0	20%	Calculated as the percentage of companies that participated in the program as a result of information obtained through one of the tools developed in the communication strategy out of the total number of participating companies (currently, most companies access the tools through information from institutions, companies, and consultants linked to FONTAR). Source: FONTAR survey of applicant companies.

Output Indicators

Outputs	Cost US$	Unit of measure	Baseline(*)	2016	2017	2018	2019	2020	Total	Means of verification/comments
Component 1: Strengthening of technological innovation capacity										
Innovation efforts by individual companies	20,220,643	Projects financed(**)	200	40	60	80	100	106	386	FONTAR and DIGFE information systems.
Highly-qualified human resources employed by companies	1,079,357	Individuals financed(**)	10	3	5	5	5	0	18	FONTAR and DIGFE information systems. This indicator will be tracked by gender.
Technological innovation projects financed in clusters and productive chains	10,000,000	Projects financed	3	0	2	4	0	0	6	FONTAR and DIGFE information systems.
Projects financed to strengthen and create technology services centers	6,700,000	Projects financed	5	0	2	4	0	0	6	FONTAR and DIGFE information systems.
Sector and regional technological innovation projects financed	28,000,000	Projects financed	10	6	10	10	5	2	33	FONARSEC and DIGFE information systems.
Technology projects financed for the development of emerging sectors	20,000,000	Projects financed	0	0	0	2	0	0	2	FONARSEC and DIGFE information systems.
Component 2: Strengthening of scientific and technology research capacity										
Scientific and technology research financed	49,000,000	Projects financed	500	500	500	500	0	0	1500	FONCyT and DIGFE information systems. This indicator will be tracked by gender for researchers who are project heads.
Collaborative research projects with companies financed	5,000,000	Projects financed	0	0	4	2	0	0	6	FONCyT and DIGFE information systems.
Projects financed to upgrade equipment	22,000,000	Projects financed	0	0	0	90	10	0	100	FONCyT and DIGFE information systems.
Projects financed to establish interagency multidisciplinary centers	10,000,000	Projects financed	0	0	3	1	0	0	4	MINCyT and DIGFE information systems.
Component 3: Monitoring, evaluation, institutional coordination, and dissemination of STI										
Surveys conducted for the preparation of STI indicators	1,000,000	Surveys conducted		1	1	3	1	1	7	MINCyT and DIGFE information systems.
CIECTI studies prepared and published	2,200,000	Studies	4	8	16	16	18	20	78	CIECTI information systems.
Projects financed to strengthen national major equipment systems and databases	3,000,000	Projects financed	10	10	8	6	6	4	34	MINCyT and DIGFE information systems.

Outputs	Cost US$	Unit of measure	Baseline(*)	2016	2017	2018	2019	2020	Total	Means of verification/comments
Plans implemented for institutional strengthening of S&T organizations	3,000,000	Plans financed(**)	2	2	2	1	0	0	5	MINCyT and DIGFE information systems.
Scientific culture projects financed	1,800,000	Projects financed	30	32	32	32	32	32	160	MINCyT and DIGFE information systems.
Hours of multimedia content	1,000,000	Hours produced	0	100	120	120	140	140	620	MINCyT and DIGFE information systems.

(*) The baseline was estimated based on ANPCyT's experience during 2010-2014.
(**) This unit of measure captures the number of projects/individuals/plans that received the first disbursement of the program during the year in question.

Outputs	Cost US$	Unit of measure	Baseline(*)	2016	2017	2018	2019	2020	Total	Means of verification/comments
Tracking the corporate sector indicator										
Individuals and productive units supported to boost competitiveness and innovation	66,000,000	Number	200	50	75	120	205	250	700	Corporate sector indicator constructed using the aggregate of the first five output indicators in Component 1. The costs are added together and the result corresponds to an estimate of the number of productive units associated with the projects financed. FONTAR, FONARSEC, and DIGFE information systems.

(*) The baseline was estimated based on ANPCyT's experience during 2010-2014.

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country:	Argentina
Project number:	AR-L1181
Name:	Technological Innovation Program IV (TIP IV)
Executing agency:	Ministry of Science, Technology, and Productive Innovation (MINCyT)
Fiduciary team:	Ana Niubó, Financial Specialist, Consultant (FMP/CAR) and Brenda Alvarez Junco, Fiduciary Procurement Specialist (FMP/CAR)

I. EXECUTIVE SUMMARY

1.1 The Risk Management Guide for Sovereign-guaranteed Projects was used for the evaluation. The Bank examined the capacity of the executing agency to implement the procurement activities and determined that the overall program risk associated with procurement management is low.

1.2 No evaluation of institutional capacity was performed since this is the fourth program of the same kind being financed, with the same executing unit, which had very positive results.

1.3 The project does not include financing from other multilateral agencies.

II. FIDUCIARY CONTEXT OF THE EXECUTING AGENCY

2.1 The executing agency's fiduciary systems are satisfactory, based on its experience with Bank-financed loans 1728/OC-AR (Technological Modernization Program III), 2180/OC-AR (TIP I), 2437/OC-AR (TIP II), and 2777/OC-AR (TIP III), to which the applicable policies were applied.

2.2 The systems used for program execution are the Sistema Integrado de Información Financiera [integrated financial information system] (SIDIF) for budgeting and the EMERIX system for financial management.

III. FIDUCIARY RISK EVALUATION AND MITIGATION MEASURES

3.1 The risk analysis (including fiduciary risks) was performed by applying the Risk Management Guide for Sovereign-guaranteed Projects at a workshop with members of the executing agency. Based on experience in similar programs, it was determined that the risk posed by the executing agency was medium.

3.2 The type of supervision for financial management and procurement management was determined on the basis of the risks identified. The type of supervision

established initially may be changed during program execution, depending on the evaluations.

Institutional capacity and fiduciary risk				
Institutional capacity		N/A	**Tool:**	N/A
Fiduciary risk		Medium	**Tool:**	PRM
Type of risk	**Risk**	**Classification**	**Mitigation measures**	
Financial management	Complexity of financial management owing to the number of projects	Medium	Revise and expand the scope of the TIP III mitigation plan.	
			Update the TIP III mitigation plan.	
Financial management	Obsolescence of the EMERIX financial management system	Medium	Analyze different alternatives for improving the existing financial management system.	
			Perform a comparative study of alternatives.	

IV. CONSIDERATIONS FOR THE SPECIAL CONDITIONS OF THE CONTRACTS

4.1 To expedite contract negotiations by the project team and by the Legal Department (LEG) in particular, the agreements and requirements to be included in the Special Conditions or in the sole annex are described below. They may be updated or changed during program execution, as necessary, contingent upon prior documentation and authorization by the Bank.

4.2 **Conditions precedent to the first disbursement.** The submission of evidence that the program Operating Regulations, previously agreed upon with the Bank, have been placed in effect will be a condition precedent to the first disbursement.

4.3 **Other execution conditions.** All the terms and conditions of the open-ended and fixed-deadline calls for proposals envisaged in the program will have the Bank's prior no objection.

4.4 **Disbursement management.** The executing agency will submit the program's financial plan, prepared in accordance with guidelines agreed on by the Bank and the borrower. The minimum percentage required to replenish the advances of funds will be 70%, since the program is decentralized and its execution is complex (ongoing flexibility).

4.5 The exchange rate to be used for accounting purposes is stipulated in Article 4.10(b)(ii) of the General Conditions of the loan contract. To determine the equivalency of expenditures incurred in local currency from the local contribution or of reimbursements of expenditures from the loan proceeds, the exchange rate will be the rate in effect on the date the borrower made the payment, as stipulated in Clause 3.03, Option A, of the Special Conditions of the loan contract.

4.6 Expenditures will be eligible as of the loan's eligibility date. Expenditures are understood as disbursements made by the program to the different projects, regardless of the date on which the beneficiary made the investment.

4.7 **Financial supervision.** Apart from the documents required to process disbursements and the annual audits, as part of financial supervision the executing agency will submit a financial plan and will indicate the amount of the advances made to projects in the semiannual reports, except in the case of science and technology research projects.

4.8 **Other specific financial management requirements.** Disbursements will be made as established in Articles 4.03, 4.04, 4.05, 4.06, and 4.07 of the General Conditions of the loan contract.

V. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

A. Procurement execution

5.1 Procurement of works, goods, and nonconsulting services will be made in accordance with: (i) the Policies for the procurement of goods and services financed by the IDB (document GN-2349-9); and (ii) the Policies for the selection and contracting of consultants financed by the IDB (document GN-2350-9), respectively. Procurement for projects awarded under Components I and II will be decentralized, while procurement for Component III will be centralized, except for procurement by CIECTI.

5.2 The country's subsystems for direct contracting via the direct contracting procedure for competitive bidding and individual consultants may be used once the implementation stage is formalized with the country's authorities, at the request of the executing agency. Subsystems approved subsequently will be used automatically and the procurement plan will identify the procedures to be carried out using those methods.

5.3 **Procurement of works, goods, and nonconsulting services.** Contracts for works, goods, and nonconsulting services[1] arising under the program will be included in the initial procurement plan, and those subject to international competitive bidding (ICB) will be undertaken using the Bank's standard bidding documents (SBDs). The program's sector specialist will be responsible for reviewing the technical specifications for procurement when selection processes are being prepared. The procurement plan will cover the first 18 months and be updated annually or as necessary, using the standard request form for procurement proposals.

5.4 **Selection and contracting of consultants.** Consulting service contracts arising under the program will be included in the initial procurement plan and executed using the standard request for proposals (SRFP) issued by the Bank. The program's sector specialist will be responsible for reviewing the terms of reference for consulting services. Each area in the executing agency requiring consulting contracts will be responsible for establishing the technical viability of the terms of reference, while the unit responsible for process management will

[1] Policies for the procurement of works and goods financed by the Inter-American Development Bank (document GN-2349-9), paragraph 1.1: Nonconsulting services are treated as goods.

verify their consistency with the Procurement Plan Execution System (SEPA). For the selection methods and contracting of consulting services, the executing agency will use SEPA for process planning and administration.

5.5 **Selection of individual consultants and direct selection.** In approved cases identified in the procurement plan, the contracting of individual consultants may be requested through local or international notices in order to assemble a short list of qualified individuals, as established in document GN-2350-9, Section V, paragraphs 5.1 to 5.4. In the case of services, the consultants will provide the executing agency with the midterm or final reports requested. For contract renewals, approval by the competent authority of the performance review, with a minimum rating of "satisfactory," will be sufficient. Evaluations will be performed once a year to facilitate their approval by the corresponding authorities. ANPCyT consultants who have been rendering services under loans 2180/OC-AR (TIP I), 2437/OC-AR (TIP II), and 2777/OC-AR-1 (TIP III) and who comply with the above may be selected directly by virtue of continuity of service.

5.6 **Training.** The procurement plan describes the procurement to be undertaken for the different project components that include training, to be contracted as consulting services.

5.7 **Recurring expenses.** Recurring expenses will be paid from the counterpart contribution following the executing agency's administrative procedures, which have been reviewed and accepted by the Bank. These expenses include the leasing of offices, the leasing of automobiles for supervisory purposes, communications, photocopies, electricity, telephone, and security services.

5.8 **Commercial practices.** Procurement for selected projects through national open-ended and fixed-deadline competitions where beneficiaries are companies will be undertaken using private sector rules.

B. Table of thresholds (US$ thousands)

Expenditure category	Amount (US$ thousands)	Procurement method	IDB review
Works	≥ 5,000	ICB	Ex ante
	< 5.000 > 350	NCB	Ex post
	≤ 350	Shopping	Ex post
Goods	≥ 500	ICB	Ex ante
	≤ 500 > 100	NCB	Ex post
	≤ 100	Shopping	Ex post
Nonconsulting services	≥ 500	ICB	Ex ante
	≤ 500 > 100	NCB	Ex post
	≤ 50	Shopping	Ex post
Consulting firms	> 500	International short list	Ex ante
	≤ 500	Short list 100% national	Ex ante
	≤ 200	Short list 100% national	Ex post
Individual consultants	See policy GN-2350-9, Section V		Ex post

Note: The thresholds for ex post reviews are established on the basis of the executing agency's fiduciary capacity and may be modified by the Bank as that capacity changes.

C. Procurement plan

5.9 See the summary procurement plan for further details.

D. Procurement supervision

5.10 Contracts subject to ex post review by the Bank will be listed in the procurement plan and will be reviewed in accordance with Appendix I of the respective policies. Contracts for amounts greater than or equal to the thresholds in the preceding table will be subject to ex ante supervision.

5.11 Ex post review visits by the Bank will take place every 12 months as a minimum. The ex post review reports will include at least one physical inspection, when appropriate. At least 10% of the reviewed contracts will be inspected physically during the program.

5.12 **Special provisions.** Measures to reduce the likelihood of corruption will follow the provisions of documents GN-2349-9 and GN-2350-9 relating to prohibited practices (lists of companies and individuals ineligible to work for multilateral agencies).

5.13 **Records and files.** Documentation of procurement processes will be kept at the offices of MINCyT/ANPCyT, which is responsible for the central program executing unit. For ex post reviews, it is very important for the records and files of all the documents generated by the procurement and contracting processes described in the program Operating Regulations to be kept in due order, classified, and up to date.

VI. Financial Management Agreements and Requirements

6.1 **Programming and budget**. The executing agency's budget contains programmatic categories and other classifications by category of expenditure (items), i.e. personnel, consumer goods, nonpersonnel services, fixed assets, transfers, financial assets, debt service and reduction of other liabilities, and other expenditures. Classified by their economic nature, the items are current expenditures, capital expenditures, and financial applications. Internal sources of financing can be the national treasury, own resources, specific allocations, and internal transfers. External financing includes external transfers and external loans.

6.2 No difficulties with timely availability of the local counterpart or systemic delays affecting execution are anticipated.

6.3 **Treasury and disbursement management**. The National Treasury Department transfers the local counterpart contribution from the Trust Fund for the Promotion of Science and Technology to the executing unit, which transfers it to an account opened by the program to be used exclusively for this loan, given that it is a program cofinanced with Bank resources.

6.4 Disbursements will be made following a detailed financial plan whose model has been agreed on with the authorities of the Ministry of Economic Affairs and the Office of the Chief of the Cabinet.

6.5 **Accounting, information systems, and reports.** The program will use EMERIX as the financial administration system**.** Accounting will be on a cash basis and International Financial Reporting Standards (IFRS) will be followed, when applicable, in accordance with established national criteria. The required financial reports will be established in Article 7.03 (a) of the General Conditions of the contract.

6.6 **Internal control and internal audit.** The national internal control authority is the Office of the Comptroller General (SIGEN). The executing agency's internal audits are performed by the Internal Audit Unit (UAI).

6.7 **External control.** External financial audits and project reports**.**

6.8 In 2011, the Bank completed a diagnostic assessment of the government auditing practices of the Office of the National Auditor General (AGN), which was performed in accordance with Bank guidelines to determine the level of development of public financial management systems. The evaluation concluded by validating the AGN as the auditor of Bank projects.

6.9 The AGN is a body that reports to Congress and assists it with control of public sector accounts. Its creation and operation are regulated under Title VII, Chapter I, of Law 24,156 on Financial Administration and External Control Systems, which specifies that the AGN is a body with its own legal status and functional independence, which means that it is also financially independent. Its assets are composed of all the goods allocated by the national government, those that previously belonged to the Tribunal de Cuentas de la Nación (Audit Office), and those transferred pursuant to legal action.

6.10 Based on terms of reference previously agreed upon with the Bank, the program's annual financial statements will be audited by an independent auditor acceptable to the Bank.

6.11 **Project financial supervision.** The initial financial supervision plan arises from the evaluations of institutional risk and fiduciary capacity, based on onsite and desk reviews planned for the project, including the scope of actions in the areas of operations, financial and accounting activities, compliance and legality, frequency, and responsibilities.

6.12 **Execution arrangements.** Detailed information on program execution can be found in the draft Operating Regulations and the proposal for operation development.

6.13 Other financial agreements and requirements. N/A.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/15

Argentina. Loan _____/OC-AR to the Argentine Republic
Technological Innovation Program IV

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 Argentine Republic, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Technological Innovation Program IV, which constitutes the fourth individual operation under the Conditional Credit Line for Investment Projects (CCLIP) AR-X1015 approved on 2 September 2009 by Resolution DE-90/09. Such financing will be for an amount of up to US$150,000,000 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 ___ _____ 2015)

LEG/SGO/CSC/IDBDOCS: 39659917
Pipeline No. AR-L1181